The $20 Billion Challenge

PRODUCTION EFFICIENCY

Metalworking needs to spend that much on equipment for optimum efficiency, a STEEL survey shows. For tips on what can be done toward meeting the challenge, see Page 42.

JANUARY 25, 1960

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

What Steel Settlement Really Means to You

AS A METALWORKING MANAGER . . .

Ways must be found to offset higher labor costs—ordinarily 30 to 50 per cent of total costs

AS A WORKER . . .

Featherbedding practices are not privileges to be protected. They threaten job security

AS A GOVERNMENT OFFICIAL . . .

Pressure for more effective controls over unions is rising. Perhaps free elections by workers, before a strike, are needed

STEEL editors analyze the impact of the settlement, starting on PAGE 33.

COMPLETE CONTENTS
TURN PAGE

METALWORKING OUTLOOK
PAGE 23

LIGHT GAUGES

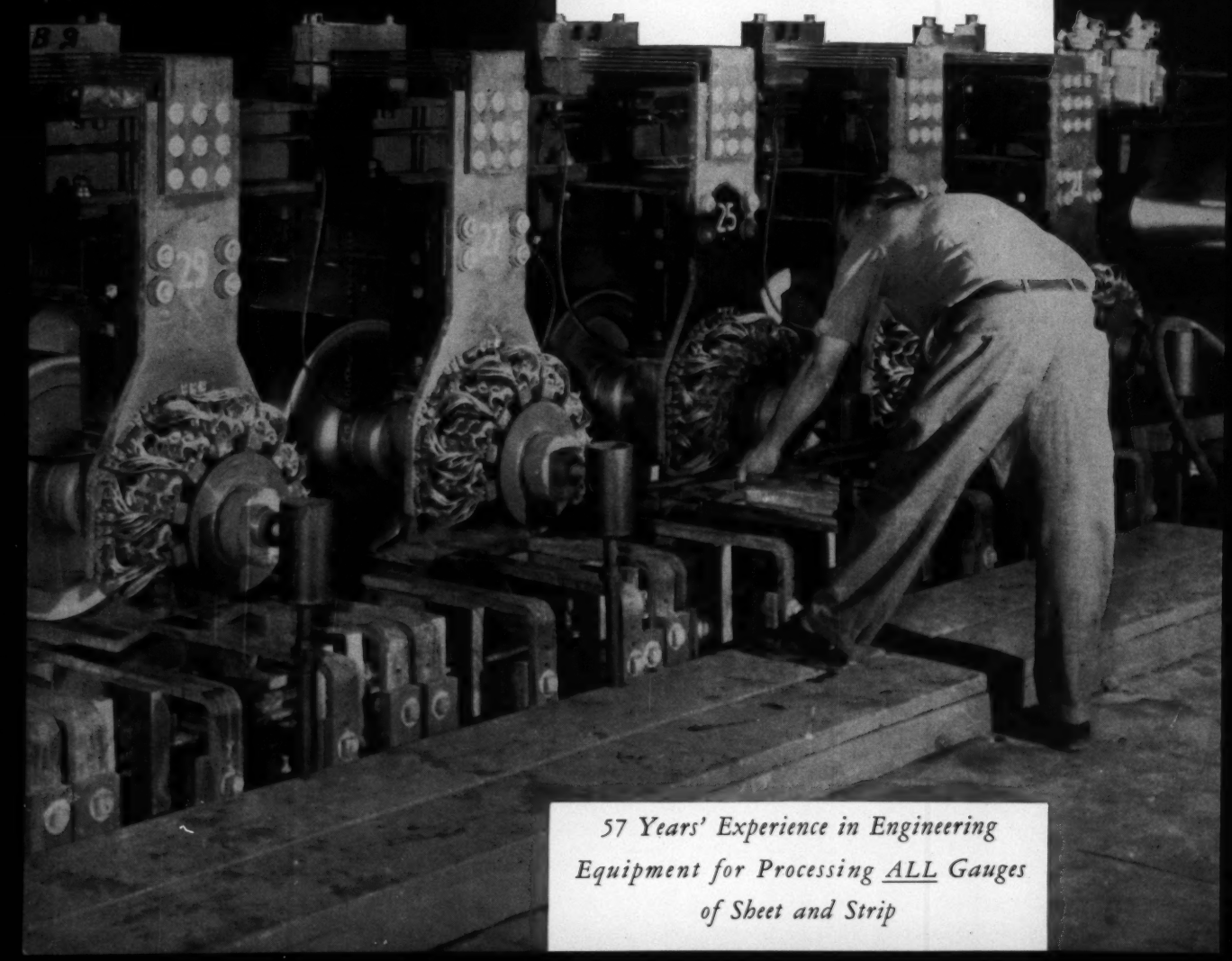
at High Speeds Need Rugged Equipment

Higher and higher speeds and lighter and lighter gauges in tin plate put a greater and greater demand on equipment. High-speed Continuous Processing Lines must be more rugged than ever before to stand up to 21-turn operation. Our experience with processing lines dates back to the earliest production of strip in coils. In those years and today, ruggedness of equipment has been a trademark of Aetna-Standard.

BLAW-KNOX COMPANY

AETNA-STANDARD DIVISION

FRICK BUILDING • PITTSBURGH, PENNSYLVANIA



57 Years' Experience in Engineering Equipment for Processing ALL Gauges of Sheet and Strip

This Week in STEEL

The Metalworking Weekly

January 25, 1960 Vol. 146 No. 4

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Index available semiannually.

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STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $20 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday and copyright 1960 by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

Metalworking Pulse ▶

TURN

Metalworking Pulse

INDUSTRIAL PRODUCTION INDEX

	WEEK ENDED JAN. 16	PREVIOUS WEEK	MONTH AGO	YEAR AGO
(1947-49=100) Based on steel output, electric power output, freight carloadings, auto assemblies	183†	182	180	160

†Preliminary.

For the second consecutive week, STEEL's industrial production index established a new high. At a preliminary 183 (1947-49=100), it was 9 points above the prestrike peak and 3 points above 1959's high, set late in December.

Details on Page 53

U. S. PASSENGER CAR PRODUCTION

	WEEK ENDED JAN. 23	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Number of units assembled	175,000*	176,245†	103,219	126,843

(Source: Ward's Automotive Reports.) *Estimated. †Preliminary.

Auto production is running at a four year high. Not since record 1955 have as many cars and trucks come off the assembly lines. But there appears to be little room left for advancement unless Saturday operations are stepped up, and sales figures do not warrant that move now.

Details on Page 50

NATIONAL STEEL INGOT PRODUCTION

	WEEK ENDED JAN. 24	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Net tons (thousands)	2,721*	2,727	2,641	2,056
Index (1947-49=100)	169.4*	169.8	164.4	128.0
Percentage of capacity	95.5*	95.7	93.3	72.6

*Estimated by STEEL; comparative figures reported by AISI.

Steel mills continue to ship record tonnages to their customers, many of whom expect to attain fairly well balanced stocks by the end of March. That would be several weeks earlier than had been expected prior to the spurt in output.

Details on Page 94

STEEL SCRAP PRICE COMPOSITE

	JAN. 20	WEEK AGO	MONTH AGO	YEAR AGO
Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.	$42.33	$41.67	$41.33	$40.67

For the second consecutive week, STEEL's composite on No. 1 heavy melting steel advanced. The rise is based on light sales. Some suppliers are limiting their offerings on the expectations of a higher market.

Details on Page 105

FINISHED STEEL PRICE INDEX

	JAN. 19	WEEK AGO	MONTH AGO	YEAR AGO
Based on Bureau of Labor Statistics data (1947-49=100)	186.8	186.8	186.8	187.0

Although producers of finished steel are maintaining firm price levels, there is evidence of intensified activity in price-cost studies. A leading distributor in St. Louis has made substantial reductions on certain hot rolled products. Standard ferromanganese has been reduced.

Details on Page 95

We think it's the largest forged hammer ram ever made

It weighs in at 50,000 pounds. And it measures 54¼ inches from top to bottom—59⅜ inches from side to side—66 inches from front to back. Here at Bethlehem, we've never heard of a larger *forged* hammer ram. Have you? If so, we'd certainly like to know the details. Would you be good enough to drop a line or two to Forgings Sales? (And end our suspense over whether we've chalked up another record, or an also-ran?)

A few other facts about this hammer ram: we forged it from nickel-chrome-molybdenum-vanadium steel; we heat-treated and tested it to our customer's specifications; and, as you can see, we furnished it finish-machined, ready to start pounding in a steam drop hammer.

Although this ram is surely a giant in its class, it's a pygmy compared to some of the forgings we've made. Our shops turn out the largest forgings ever needed—some weighing over 200 tons. (Some of the smallest, too—drop forgings, for example, that weigh as little as one pound.)

Call us when we can be of service to you or members of your staff. Our engineers will gladly cooperate, from the planning stage to the finished product—whatever the type, size, or design of forging you require.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

EC-1357 cuts costs, makes possible stronger sandwich panels

LABORATORY TESTS show EC-1357 provides the high strength and rigidity called for in nonload-bearing sandwich structures.

3M Adhesive EC-1357 bonds all kinds of skin and core materials *without heat*. You'll speed production, cut costs, build in high strength for non-load-bearing sandwich panels.

You can force-dry the solvent out of the adhesive prior to bonding. And a nip roller or cold press is all that is required to complete the bond.

EC-1357 provides maximum immediate strength. And the bond continues to strengthen as it cures at room temperatures.

Dark in color, EC-1357 absorbs infrared heat quickly, dries fast; so no production delay is necessary. And it sprays on with minimum cobwebbing, thus saving materials.

SEE WHAT 3M ADHESIVES CAN DO FOR YOU:
Consult 3M Research. Contact your 3M Field Engineer. Or, for information and free literature, write: A.C.&S. Division, 3M, Dept. SBEE-10, St. Paul 6, Minnesota.

ADHESIVES, COATINGS AND SEALERS DIVISION

MINNESOTA MINING AND MANUFACTURING COMPANY

...WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

AEROPARTS MANUFACTURING COMPANY'S RECIPE FOR SUCCESS

Take on the Tough jobs put them on a Warner & Swasey

R. E. Radford started his company in Tulsa, Oklahoma, in 1943 with a $350.00 investment. Today, his new 40-man plant does sub-contracting on a national scale with a reputation for price and quality.

But, success was not immediate. Even as late as 1952, business prospects looked dim. Then, a man's resourcefulness plus a new kind of machine teamed up to start a literal chain reaction of success. Here's how it happened.

Radford had the idea that there was a profitable future in taking on the tough jobs that were not desirable to other companies. He also had faith to back his convictions. Now all he needed was the right machine to do the job . . . his search was a short one . . . the new Warner & Swasey 1 AC looked like the machine.

This new single spindle chucker allowed him to expand from his former policy of making screw machine parts to one involving larger, more complicated work . . . permitted him to run short cycle jobs at close tolerances of .001" and less . . . hold micro-inch finishes down to 20 RMS . . . make full use of the machine's late cross slide, flexible tooling characteristics. The dependability of this machine impressed him as much as did its productivity.

These advantages, and others that soon reflected themselves in increased values rendered to his customers, brought more business. So another Warner & Swasey 1 AC was installed in 1954 and a third in 1955.

Today, men and management at Aeroparts maintain their high regard for their Warner & Swaseys. And in "Tex" Radford's words, "These machines were integral in the growth of this company!"

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS

...WITH A WARNER & SWASEY

WARNER & SWASEY
Cleveland
PRECISION MACHINERY SINCE 1880

"We found a way to get complete inventory turnover in 60 days,"

says Mr. Robert W. Boldt, Purchasing Agent, Borg-Warner Industrial Cranes, Ingersoll Products Division, Borg-Warner Corporation, Chicago, Illinois
Manufacturers of overhead, gantry and jib cranes.

"Our cranes are designed and engineered to fit the duty cycle of a particular job," says Mr. Boldt. "We buy material on a tailor-made basis, because we can't anticipate our needs. We maintain the smallest possible inventory and concentrate our purchases on a day-to-day basis.

"U.S. Steel Supply has helped us reach a high degree of production efficiency in our existing plant area. We've reduced capital investment and eliminated a lot of scrap loss. We get fast replacement of off-standard specifications. We've slashed inventories and brought our goal for a 60-day inventory turnover within range."

Do you have an inventory problem? A scrap problem? A production problem? Perhaps U.S. Steel Supply's new and helpful booklet entitled "How To Subtract Hidden Inventory Costs" can help you solve it. Write to our Chicago Office, or call your nearest U.S. Steel Supply Steel Service Center. You'll find us in the Yellow Pages listed under *Steel*.

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General Offices: 208 South LaSalle Street, Chicago 4, Ill.

Please direct all correspondence to attention of Ed Service, STEEL, 1213 W. Third St., Cleveland 13, Ohio.

January 25, 1960

Beat-the-Experts Winner . . . Thomas A. Casey

• An industrial engineer with Pennsylvania Power Co., New Castle, Pa., picked up this handsome 24 in. model of GM's Firebird III in the second phase of our 1959 contest

In estimating U. S. passenger car production for calendar 1959, Mr. Casey says he simply doubled the figure which he submitted in STEEL's earlier (six month production) contest. His winning entry was 2827 under the U. S. passenger car production figure, 5,593,731, tabulated by *Ward's Automotive Reports.*

The Nearest Contender . . .

. . . for the No. 1 position was Fred C. Beardsley, superintendent of production planning, Thomas Strip Div., Pittsburgh Steel Co., Warren, Ohio. His guesstimate, 5856 more than the preliminary *Ward's* figure, earned him a full color print of the dream car rendered for STEEL's contest by George W. Walker, Ford Motor Co. vice president and director of styling.

The Field Was Spread Out

There was quite a bit of leeway between the estimates of the No. 1 and No. 11 winners. Here are the guesses made by the other runners-up who also became recipients of dream car prints:

Edward C. Schmidt, vice president, Pucel Enterprises Inc., Cleveland (off 9287); John L. Polk Jr., design engineer, Alco Products Inc., Schenectady, N. Y. (off 10,571); A. J. Schildbach, manager, Hicks Development Div., Ferguson Machinery Co., Lebanon, Ind. (off 11,335); C. Elwood Krimm, crib attendant, Avco Mfg. Corp., Williamsport, Pa. (off 12,731); Joseph H. McElroy Jr., foreman, Bulova Watch Co. Inc., Providence, R. I. (off 18,405); Joe H. Wright, marketing analyst, Texas Instruments Inc., Dallas (off 19,119); J. G. Rankart, vice chairman, Defect Free Committee, Buick-Oldsmobile-Pontiac Assembly Div., General Motors Corp., Doraville, Ga. (off 24,988); John J. Bowers, engineer, Central Foundry Co., Holt, Ala. (off 26,225); and L. F. Kielsmeier, general supervisor of industrial sales, Ohio Edison Co., Akron (off 26,731).

Hold on Until July

Those men won out over 821 other entrants. There's hope for the losers, however. We have 1584 guessimators in STEEL's second Beat-the-Experts contest. They forecasted U. S. auto production for the first six months of 1960 and one of them will win two weeks' free use of any Ford Div. car—from the Falcon through the Thunderbird. Next best guessers will collect full color prints of a dream car designed by Virgil M. Exner, Chrysler Corp. vice president and director of styling. We'll be around with the results next July.

Will you be one of the STEEL readers who will win $1000? See Servicenter next week.

We Hear from Mr. Boulware

"I am grateful for your objective and accurate but nonetheless indulgent treatment of the subject matter in 'Marketing Methods Sell Labor on GE,'" (STEEL, pp. 94-96, Dec. 7, 1959), comments Lemuel R. Boulware, vice president, General Electric Co., New York. (Mr. Boulware is chief architect of the company's labor relations policy.) He continues: "I really think your effort will

TO
FIND
THE MAN
YOU NEED . . .

Place an advertisement in the "Help Wanted" columns of STEEL's classified pages. Your advertisement will reach the qualified men you need, because STEEL is addressed to highly-trained men in all phases of metalworking

STEEL
The Metalworking Weekly

mean a real contribution that will help people clarify their thinking in a most important field."

How Do You Benefit?

Millions of people will cram gigantic exhibition halls this year while attending conventions and trade shows, the modern counterparts of the Roman forum and ancient market place. Covering the thousands of yearly conferences, exhibitions, and seminars is a staggering job. Next week, New York Editor Brian Wilson will give you a program of dos and don'ts for trade show exhibitors and viewers. He has interviewed professional organizers of trade shows, exhibitors, and managers of exhibition halls to find out how you can get the most for your money and time. If you plan to attend any of the meetings scheduled in 1960 (129 were listed in STEEL, Jan. 4, pp. 345-348) this article could benefit you.

Salvage from the Battle

Somewhere east of this page, the editors seriously analyze reactions to the steel settlement. Ed Service got some impressions on the situation from an anonymous versifier. We'll accept any verses you wish to add.

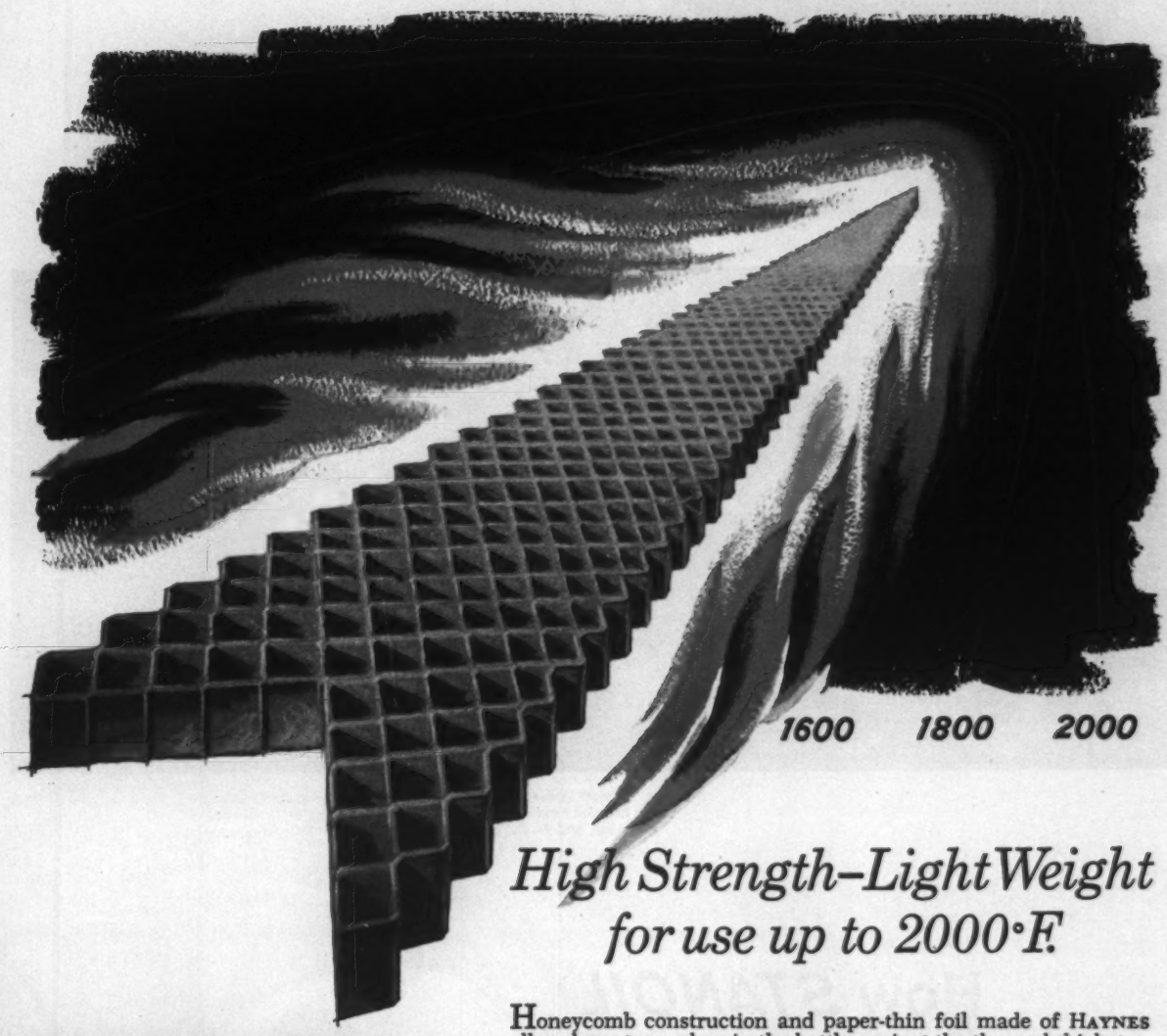
$16 a Ton

Some folks say the steel fight's won . . .
Inflation's halted; a new deal's begun:
Good times are comin', prosperity's back . . .
Without raisin' prices? In a pig's eye, Mac!

You make sixteen tons, and what do you get?
Sixteen tons, and deeper in debt;
Costs some more, to make a ton . . .
It's the sixteen bucks the steelworkers won.

That high cost production, you'll have to pay,
Ain't half 's bad as some folks say:
PRODUCTION EFFICIENCY! That's the key—
Steelmen 'n' managers, all agree.

You make sixteen tons, and it costs you more . . .
(Those sixteen bucks we noted before)
Watch your production, check all your costs;
Much can be saved from a battle lost.



High Strength–Light Weight for use up to 2000°F.

Honeycomb construction and paper-thin foil made of HAYNES alloys have teamed up in the battle against the thermal thicket. The result? a strong, lightweight material that resists temperatures in the 2000+ deg. F range. A material that enables engineers to design parts with exceptional heat-resistant characteristics and with high strength to weight ratios; components that equal the high-temperature resistance of solid sections, yet weigh only 1/10th as much.

Foil as thin as 0.002 inch is now available in HAYNES alloy No. 25, HASTELLOY alloy X, and MULTIMET alloy. It can be obtained as foil, for use in engine blanketing for example, or in honeycomb form.

HAYNES high-temperature alloys are produced in many other forms, too. Sheet, plate, bar stock, wire, tubing, and castings are all immediately available. For full information, write for descriptive literature.

High quality and availability of HAYNES wrought alloys are assured because they are produced in our own plant by experts. Sheet, above, is being hot-rolled on a 3-high mill.

HAYNES
ALLOYS
HAYNES STELLITE COMPANY
Division of Union Carbide Corporation
Kokomo, Indiana

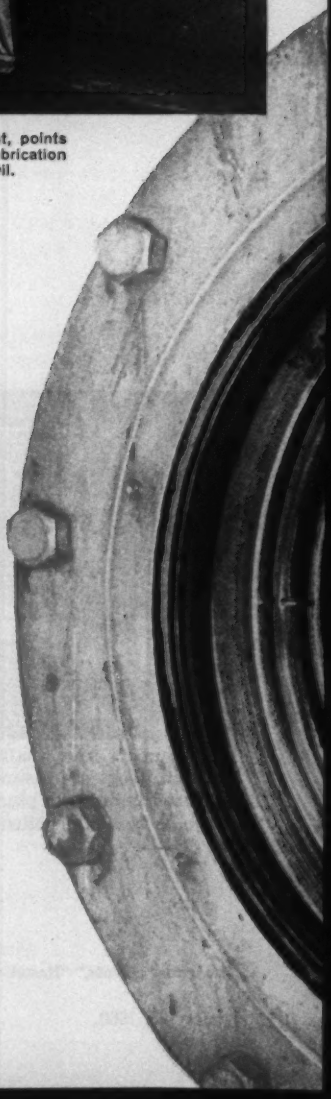
UNION CARBIDE

The terms "Haynes," "Hastelloy," "Multimet" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

PERFORMANCE REPORT

R. J. Huff, Granite City maintenance superintendent, points out Morgoil bearings to J. H. Koester, Granite City lubrication engineer, and W. P. "Sandy" Wehking of Standard Oil.

How *STANOIL Industrial Oil has been delivering on 22-year assignment at Granite City Steel*



Bearing assembly viewed from inside by J. H. Koester and Sandy Wehking. Sandy Wehking knows industrial lubrication. For 17 years he's been providing lubrication technical service to industrial customers. He studied chemistry at Blackburn College and has completed the Standard Oil Sales Engineering School.

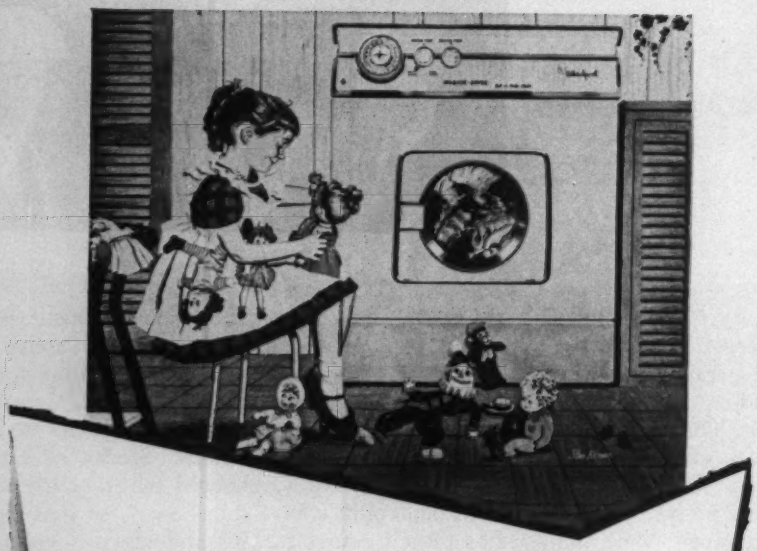
Situation: In 1937, Granite City Steel installed STANOIL Industrial Oil in the Morgoil Back-up Roll Bearings in the five-stand finishing train of their hot strip mill. Each bearing has a load-carrying capacity of more than three million pounds. The oil on which these bearings ride must be of high quality to meet the requirements of this severe service. A narrow viscosity range is required to assure proper operation of the mill throughout the speed range. More than 10,000 gallons of water per minute are used to cool the work rolls. The oil thus must have superior demulsibility to prevent water contamination.

What has happened: Today approximately 1,800 tons rolled is the average shift production. A record of over 2,700 tons rolled has been racked up by one shift in this mill. STANOIL Industrial Oil has continued to deliver top operating performance under these increasingly demanding conditions. Samples of the oil are taken regularly by the Standard Oil lubrication specialist for laboratory analysis to make sure the oil is maintaining specifications. Stocks of STANOIL Industrial Oil are warehoused by Standard at East St. Louis, only twelve miles away, so that the mill has a ready source for the product whenever needed.

What you can do: Get all the facts about STANOIL Industrial Oil from the Standard Oil lubrication specialist near you in any of the 15 Midwest or Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

STANDARD

You expect more from Standard and you get it!



at Whirlpool you'll find...

FEDERAL-WARCO

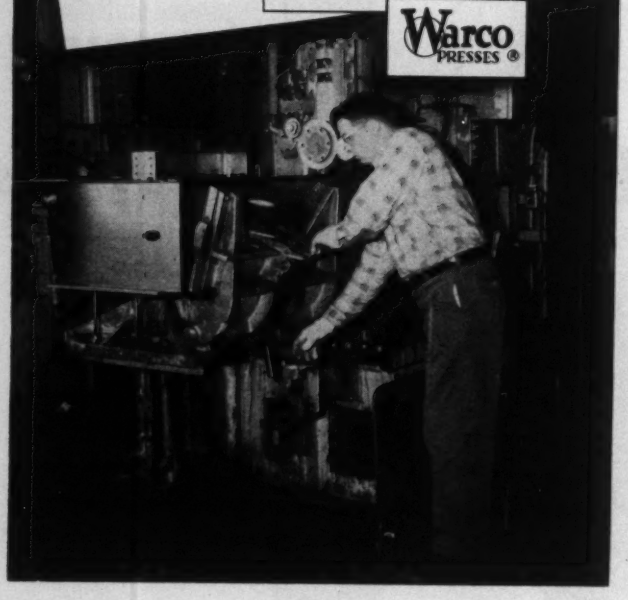
Federal automatic resistance welders engineered to give Whirlpool the production they wanted without sacrificing famous Whirlpool quality. Federal welders are integral parts of many of Whirlpool's production lines, helping form and assemble at extra high speeds without breaking stride.

Leading metal fabricators from coast to coast, especially those who require high production and unsurpassed quality, have learned they can depend on the performance of Federal resistance welders and Warco mechanical presses, precision engineered by:

THE FEDERAL MACHINE AND WELDER COMPANY
WARREN, OHIO

Federal® WELDERS

Warco® PRESSES



CALENDAR
OF MEETINGS

Jan. 25-27, American Management Association: International management conference, Roosevelt Hotel, New York. Association's address: 1515 Broadway, New York 36, N. Y.

Jan. 25-28, Plant Maintenance & Engineering Conference and Show: Convention Hall, Philadelphia. Information: Clapp & Poliak Inc., 314 Madison Ave., New York 17, N. Y.

Jan. 26-27, Society of Vacuum Coaters: Winter meeting and technical conference, Hotel Biltmore, New York. Information: John H. Smith, Application Engineer, Technical Services Dept., Consolidated Electrodynamics Corp., 1775 Mt. Read Blvd., Rochester 3, N. Y.

Jan. 27-29, Southern Industrial Distributors Association: Annual meeting, Roosevelt Hotel, New Orleans. Association's address: 1626 Fulton National Bank Bldg., Atlanta 3, Ga. Secretary-treasurer: E. L. Pugh.

Jan. 28, Cutting Tool Manufacturers Association: Annual meeting, Harmonie Club, Detroit. Association's address: 1216 Penobscot Bldg., Detroit 26, Mich. Executive secretary: Martin J. Ewald.

Jan. 31-Feb. 5, American Institute of Electrical Engineers: Winter meeting, Statler-Hilton Hotel, New York. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: F. J. Van Antwerpen.

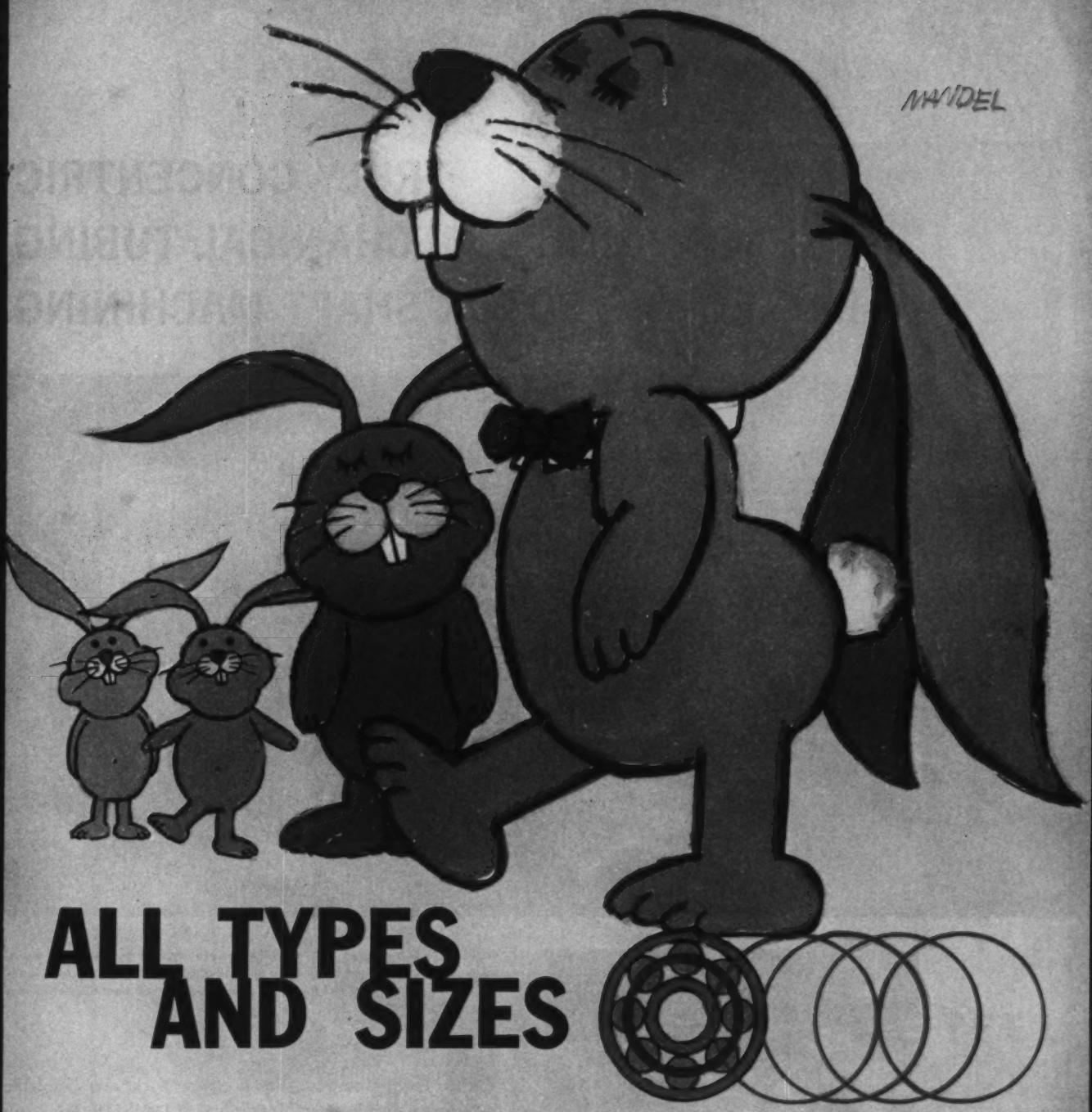
Jan. 31-Feb. 6, Association of Steel Distributors Inc.: Annual convention, El Mirador Hotel, Palm Springs, Calif. Association's address: 29 Broadway, New York 6, N. Y. Counsel: Morris Rosoff.

Feb. 1-4, American Society of Heating, Refrigeration & Air Conditioning Engineers: Southwest heating and air conditioning exposition, Memorial Auditorium, Dallas. Information: International Exposition Co., 480 Lexington Ave., New York 17, N. Y. President: E. K. Stevens.

Feb. 1-4, Instrument Society of America: Instrument-automation conference and exhibit, Rice Hotel and Sam Houston Coliseum, Houston. Society's address: 313 Sixth Ave., Pittsburgh 22, Pa. Executive director: William H. Kushnick.

Feb. 1-5, American Society for Testing Materials: Committee Week, Sherman Hotel, Chicago. Society's address: 1916 Race St., Philadelphia 3, Pa. Executive secretary: Robert J. Painter.

Feb. 2-4, Society of the Plastics Industry Inc.: Reinforced Plastics Division conference, Edgewater Beach Hotel, Chicago. Society's address: 250 Park Ave., New York 17, N. Y. Executive vice president: William T. Cruse.



ALL TYPES AND SIZES

Here at Federal, we're proud fathers to over 12,000 different sizes of ball bearings and hundreds of types. A fine family and still growing, (not that we want to boast.) 12,000 strong, they stand ready to satisfy almost any application need that American industry can think of (and believe you us, American industry can think of some lulus). Would you like to meet the Federal family? We just happen to have their pictures – and names and numbers – in the form of a handy catalog which we'll ship you at the drop of a letterhead. Best looking, hardest working bunch of ball bearings you've ever seen. Write for it today.

THE FEDERAL BEARINGS CO., INC., Poughkeepsie, N. Y.

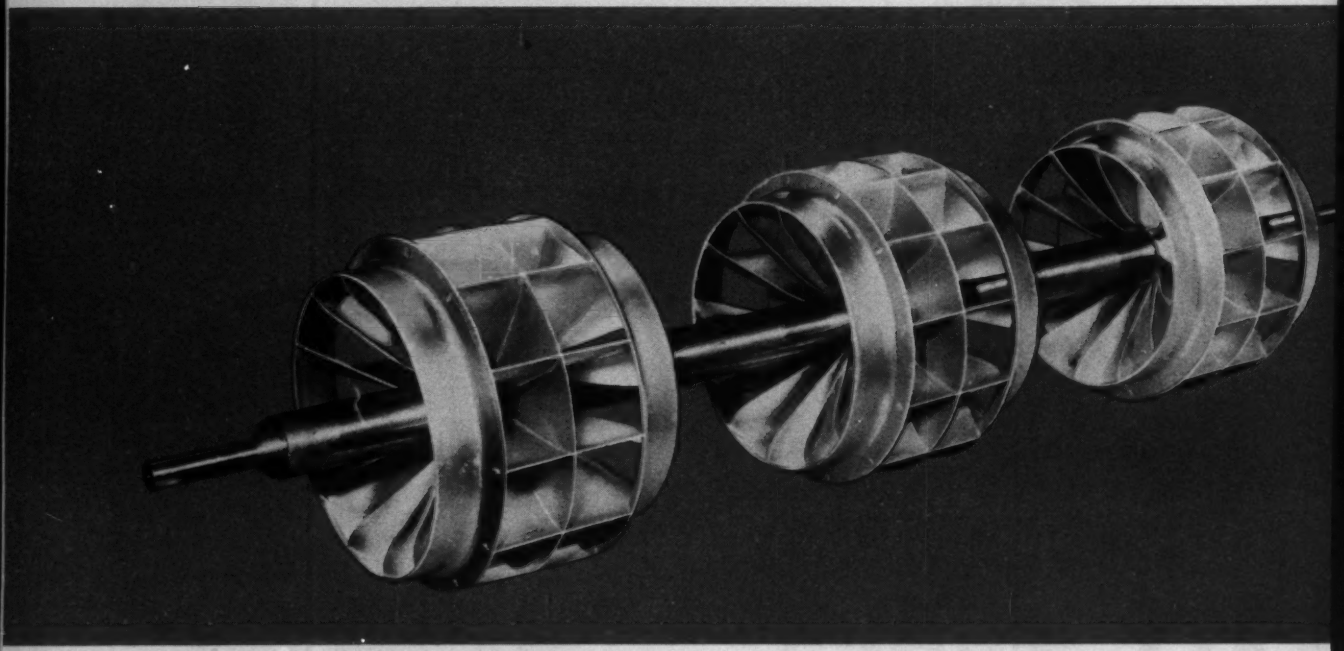
Federal

BALL BEARINGS

One of America's largest ball bearing manufacturers

FEDERAL ON FILM—A 16 mm. color sound film takes you through our 400,000 sq. ft. plant. Loaned free. Just ask for it.

TRULY CONCENTRIC ELECTRUNITE MECHANICAL TUBING ELIMINATES ROTOR SHAFT MACHINING



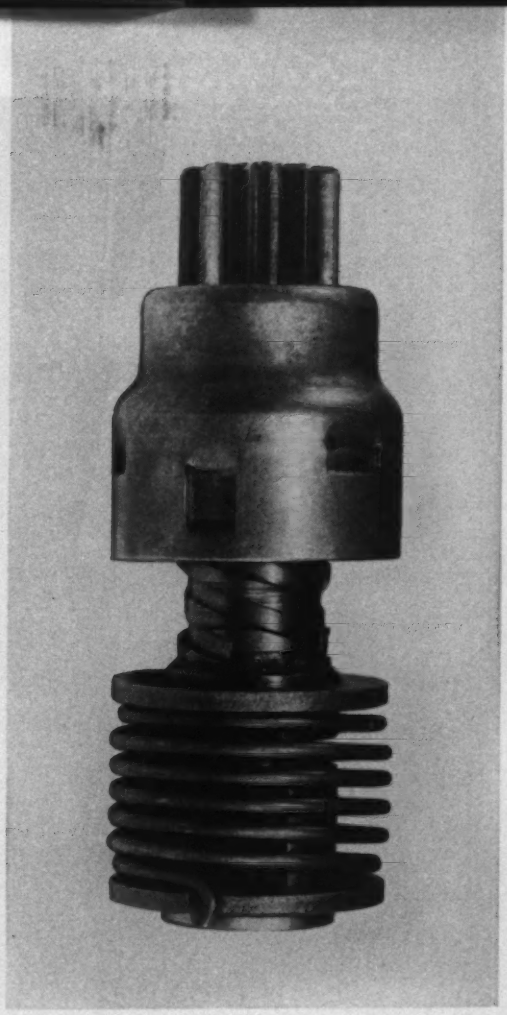
SCROLL-TYPE BLOWERS up to 27″ in diameter are mounted on ELECTRUNITE shafts, some up to 94″ long, and designed to operate at approximately 1,110 rpm. Careful balance and uniformity of the tubing is required for high operating efficiency.

DUE TO THE UNIFORM CONCENTRICITY of Republic ELECTRUNITE Mechanical Tubing, no machining is required in producing air conditioning rotor shafts at Buffalo Forge Company. Rotor shafts are bored at each end and plug inserted for the bearing. Because of the uniformity of ELECTRUNITE, only .015 of the stock is removed before the plug is pressed into the tubing ends.

Buffalo Forge Company, Buffalo, New York, saves valuable machining time by using Republic ELECTRUNITE® Mechanical Tubing in manufacturing air conditioning and ventilating units. ELECTRUNITE in sizes of 3″ to 3¼″ O.D., 8-gage, is used as shafting for the rotors of the blower system.

Scroll-type blowers up to 27″ in diameter are mounted on ELECTRUNITE shafts, some up to 94″ long, and designed to operate at approximately 1,110 rpm. Small shafting will turn at 2,300 rpm. True concentricity of ELECTRUNITE is vital to high operating efficiency of these units due to the careful balance required in relation to the high rpm and weight involved.

Republic ELECTRUNITE Tubing, carbon or stainless, may solve your particular production or cost problems, too. Call your Republic representative, or write direct.



2.

3.

1.

1. FIVE REPUBLIC METAL POWDERS give you broad spectrum coverage. Republic's wide range of iron and alloy powders cover all known physical property requirements of metal part fabricators. Send for booklet, ADV. 1014 for complete technical information on Types G, N, S, and Type MS. Information on Type HS6460 is contained in booklet, ADV. 1028. Write today.

2. REPUBLIC COLD DRAWN ALLOY STEEL is used by a leading manufacturer for one of the most critical components in their automobile starter drive assemblies—the drive pinion. Use of Republic Cold Drawn Alloy provides the necessary strength and toughness to withstand severe torque, impact, and prolonged wear. Write for additional information.

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World's Widest Range of Standard Steels and Steel Products

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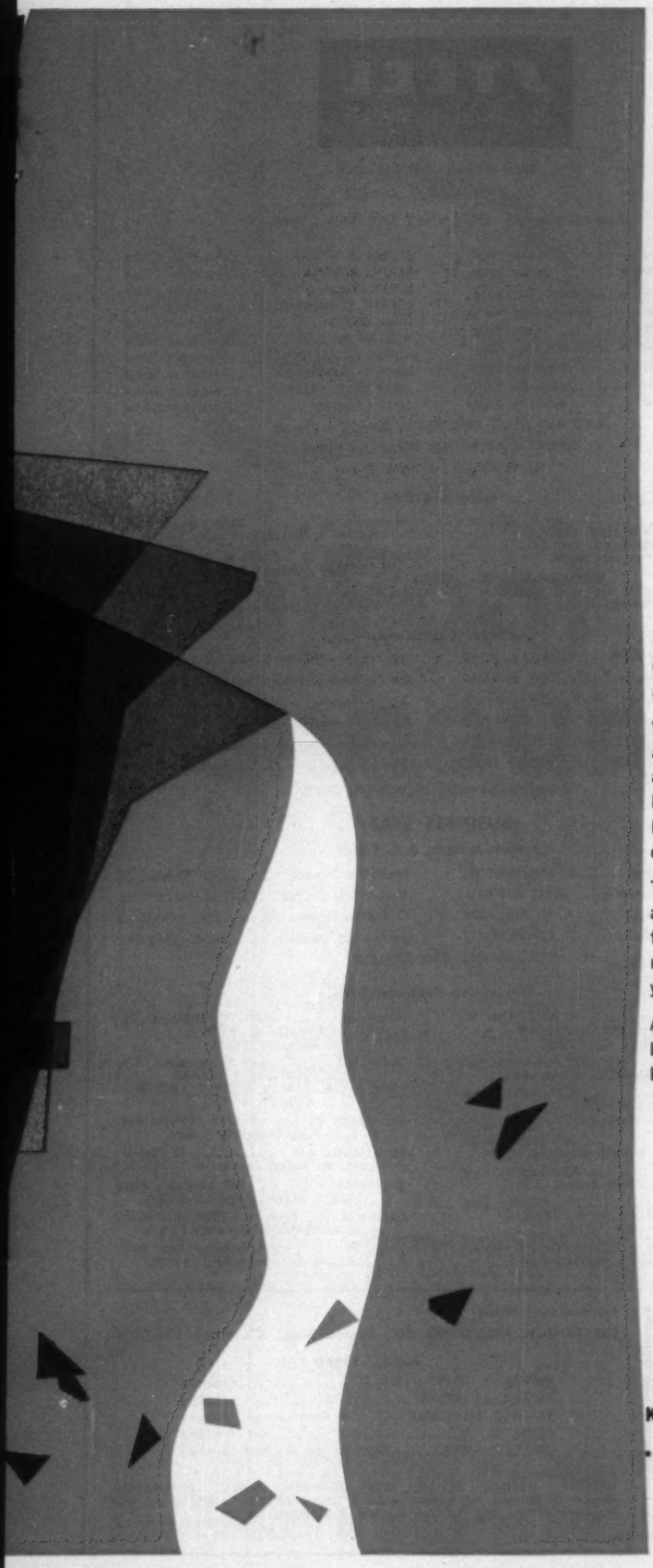

NEW STEEL PRODUCTION RECORDS WITH KAISER BASIC REFRACTORIES!

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BREAKS PRODUCTION RECORD: "... last furnace rammed with Permanente 165 broke its old production record by more than enough to pay for the bottom."

GUNNING FOR PROFIT: ". . . consumption of K/R 165 Gunning Grains is down to 4.5 pounds per ton compared to 6 pounds for competitive mix – makes it a paying proposition."

EACH of these statements from Kaiser Refractories customers reports a new performance record or production record made possible by changing to a Kaiser Refractories Product.

WHY THIS UNIFORM SUPERIORITY? Kaiser Refractories are especially designed for peak performance in specific applications in open hearth and electric steel furnaces. Each is a specially-developed composition, and all are backed by more than 17 years of continuous research and development.

The uniform composition of Kaiser Refractories—your guarantee of dependability—is assured by Kaiser Refractories' fully-integrated facilities. Quality is rigidly controlled from raw material production to assistance in final installation at your mill.

Ask to see the 30-minute color movie, "Progress in Modern Basic Refractories." Arrangements will be made by your Kaiser Refractories Sales Representative.

KAISER REFRACTORIES*

Mexico Refractories Company now merged with Kaiser Refractories

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Kaiser Periclase Brick, Mortars, Grains and Ramming Mixes

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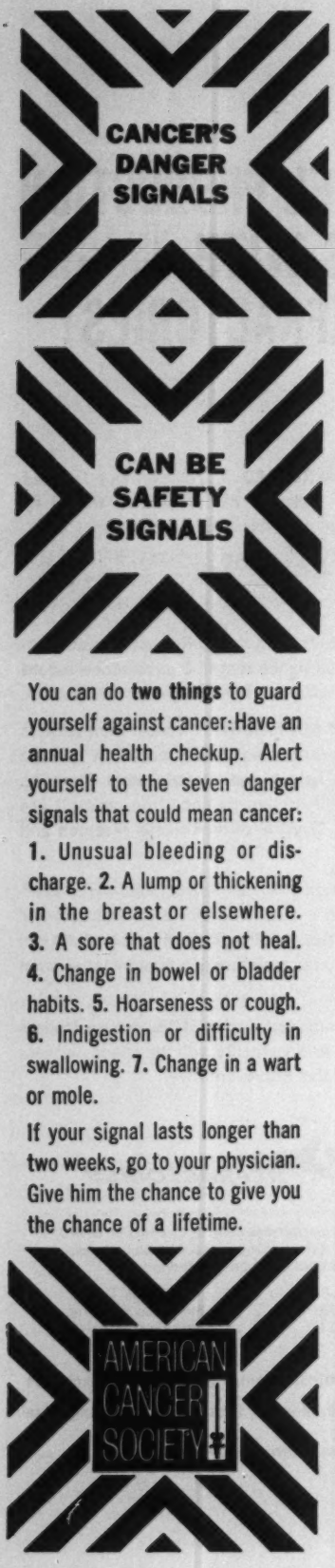
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DANGER
SIGNALS
CAN BE
SAFETY
SIGNALS
You can do two things to guard yourself against cancer: Have an annual health checkup. Alert yourself to the seven danger signals that could mean cancer:
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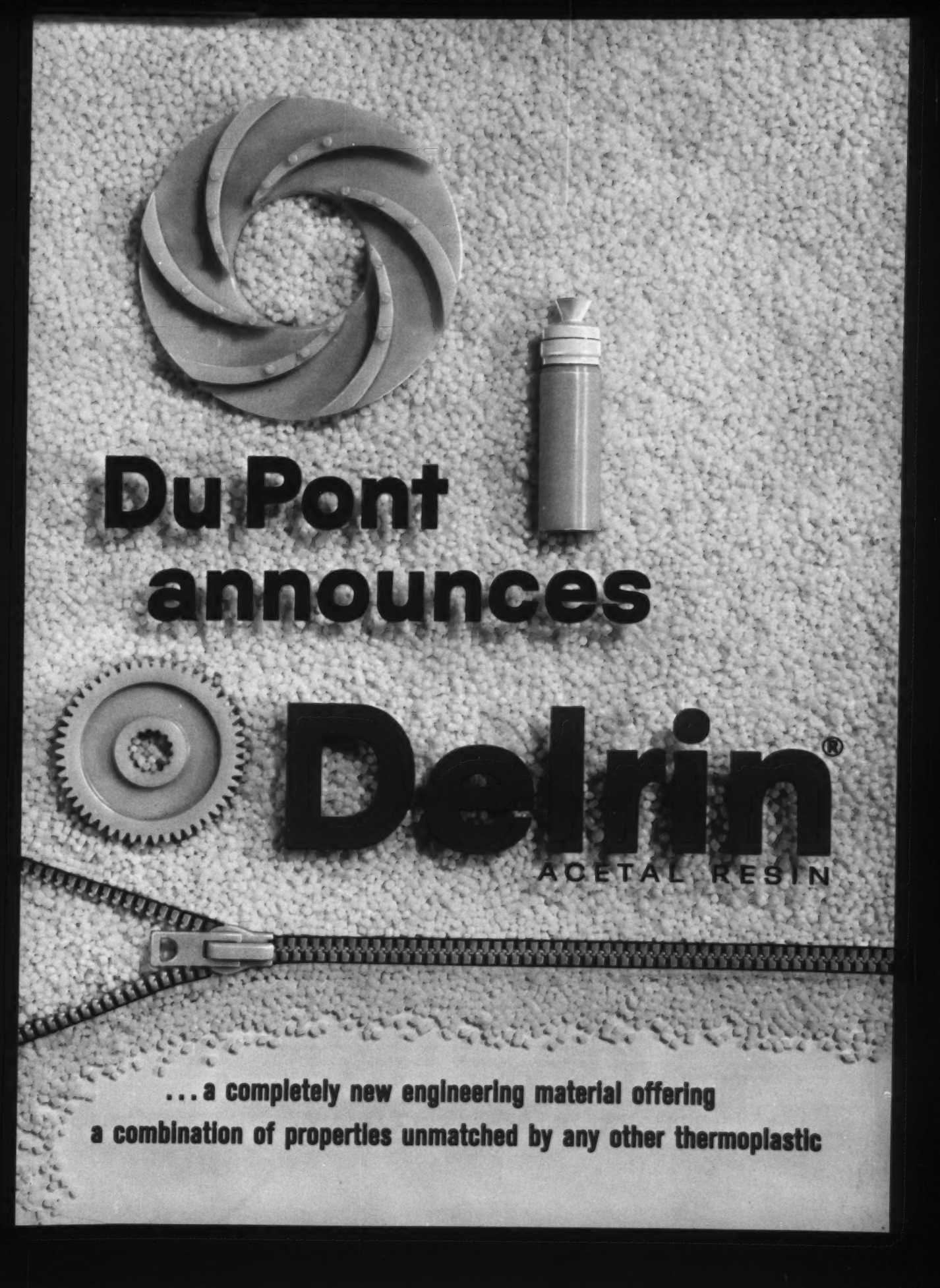

Du Pont
announces
Delrin®
ACETAL RESIN
...a completely new engineering material offering
a combination of properties unmatched by any other thermoplastic

This is Du Pont Delrin®:

"Delrin" acetal resin is a highly crystalline, stable form of polymerized formaldehyde. This completely new material offers you metal-like mechanical properties, such as a high degree of strength and rigidity, plus other properties that metals do not possess.

The combination of properties offered by "Delrin" is unequaled by any other thermoplastic. For example, "Delrin" has high dimensional stability, tensile and flexural strength, resilience and toughness. Most importantly, "Delrin" retains these desirable properties under a wide range of service conditions—temperature, humidity, solvents and stress.

Over the past three years, "Delrin" has been

Typical performance and production advantages of "Delrin"

A brass part in a commercial flush valve was duplicated in "Delrin". This part operated perfectly for 18 months—the period of test—although it was completely and continuously immersed in water. The outstanding dimensional stability of "Delrin" under a wide variety of service conditions has also been proved, for example, in showerheads (continuously running water at 150°F.), and movie projector gears (run over 2,000 hours at ambient humidity).

This textile solution pan is ordinarily made of stainless steel. It must have resistance to oils and organic solvents, a clean, smooth surface; it also requires several threaded inserts plus other details. In normal quantities, stainless steel pans cost approximately $25 each. Injection molded in "Delrin", the cost was quoted at about $3 each. Testing showed that "Delrin" provided the required finish without machining, the needed solvent resistance, plus a weight saving of 75%.

A zinc die-casting mold was used to make this instrument cluster of "Delrin". Weight was reduced over the zinc component by almost 80%. In addition to manufacturing economies, further savings in assembly are indicated: self-tapping screws can be used, since the creep resistance of "Delrin" prevents loosening or stripping. These clusters can be molded in integral color or painted, and with a conventional mold would require little, if any, mechanical finishing.

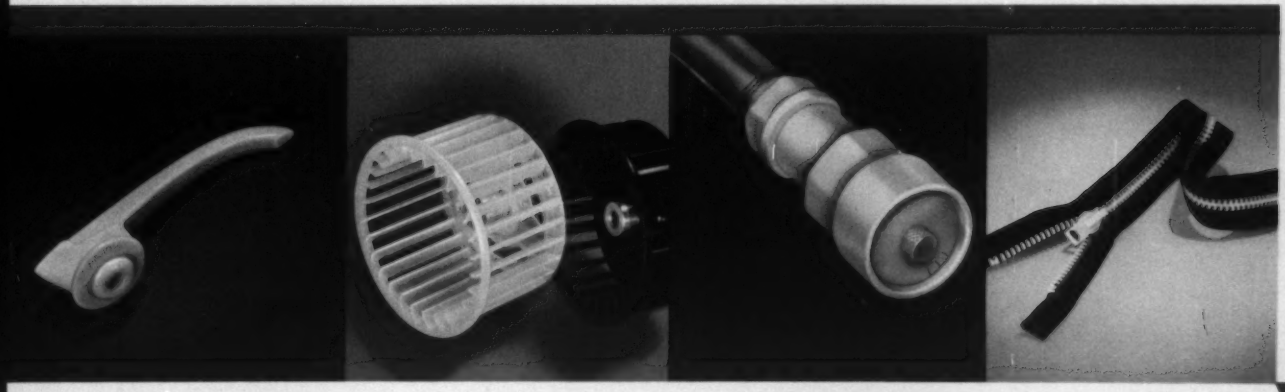
Aerosol containers made of "Delrin" were shelf-stored for over a year; others stored for 3 months at 130°F. In both cases, the contents were still completely dischargeable. "Delrin" retains its strength and toughness for long periods, even when exposed to elevated temperatures and organic solvents. Equally important are the new opportunities for high styling opened by "Delrin"—the freedom to design in new shapes and integral colors to suit purchasing trends.

tested in hundreds of end-use applications by a host of industrial concerns. These tests have confirmed that parts made of "Delrin" can compete *on a performance and cost basis* with parts made of many metals, rubber, glass or wood. Of the various end-uses tested, 75% would normally be made of metal and another 10% of rubber, glass or wood. These tests have resulted in many applications of "Delrin" now being readied for commercial production—including gears, bearings, housings, containers, plumbing and hardware parts, pump impellers, "squirrel-cage" blowers, door handles, clothing fitments and many others.

In addition to metal-like performance, "Delrin" offers you the manufacturing economies inherent in the production methods of the plastics industry. "Delrin" is easily injection molded, extruded, blow-molded or fabricated with conventional machine tools.

Illustrated below are a few of the applications of "Delrin" which have undergone extensive field service tests. The performance and economies listed were indicated during comparative evaluations made with materials in use at the time of the tests. These applications, together with additional data on the following page, may well suggest ways in which this versatile new engineering material can help *you* improve a product, lower its cost or develop new designs for your profit. Your inquiry is invited (see coupon on next page).

evaluated during three years of field tests . . .



Accessories usually made of metal, such as automotive window cranks and refrigerator door handles, can be economically mass-produced in "Delrin" by injection molding. "Delrin" provides required strength and rigidity. Integral colors, a variety of surface effects and functional details can be produced in one operation. Less weight, improved styling, dependable performance and potential cost savings are made possible by "Delrin".

Industrial components such as this "squirrel-cage" blower—as well as a variety of gears, bearings and other mechanical parts—have demonstrated the ability of "Delrin" to compete with various metals on a performance and cost basis. "Delrin" offers excellent fatigue life even when immersed in oil or water. Rapid production of lightweight, intricate components by the injection molding process can lead to substantial manufacturing economies with "Delrin".

Plumbing fixtures made of "Delrin", such as this showerhead, offer the manufacturer new styling and design advantages . . . and the home owner new latitudes in bathroom décor. Injection molded in integral color, fixtures made of "Delrin" assure builders and home owners of long-term dimensional stability, freedom from rust and mineral build-up. Modern in design, they are durable and dependable in service, and provide opportunities for potential cost savings.

Clothing fitments, such as zippers, clasps and snaps, are also readily and economically molded in "Delrin". Stiffness, toughness and resistance to heat, body oils and perspiration make "Delrin" a logical choice for such uses. Your customers would welcome the light weight, colorability and warm-to-the-touch benefits "Delrin" offers. Extensive field tests have demonstrated that "Delrin" is one of the most promising new materials available to the fitments industry.

TYPICAL PROPERTIES OF "DELRIN" ACETAL RESIN

			500X	150X
Elongation	—68°F.	D638	13%	38%
	73°F.	D638	15%	75%
	158°F.	D638	330%	460%
Impact strength, Izod	—40°F.	D256	1.2 ft.lb./in.	1.8 ft.lb./in.
	73°F.	D256	1.4 ft.lb./in.	2.3 ft.lb./in.
Tensile strength and yield point,	—68°F.	D638	14,700 psi	
	73°F.	D638	10,000 psi	
	158°F.	D638	7,500 psi	
Compressive stress at 1% deformation		D695	5,200 psi	
at 10% deformation			18,000 psi	
Flexural modulus,	73°F.	D790	410,000 psi	
	170°F.	D790	190,000 psi	
	250°F.	D790	90,000 psi	
100% RH 73°F.		D790	360,000 psi	
Flexural strength		D790	14,100 psi	
Sheer strength		D732	9,510 psi	
Heat distortion temperature,	264 psi	D648	212°F.	
	66 psi	D648	338°F.	
Fatigue endurance limit, 50 to 100% RH 70°F.			5,000 psi	
100% RH 150°F.			3,000 psi	
Water absorption, 24 hours immersion		D570	0.12%	
equilibrium, 50% RH		D570	0.2%	
equilibrium, immersion, 77°F.			0.9%	
Specific gravity		D792	1.425	
Rockwell hardness		D785	M94, R120	
Flammability		D635	1.1 in./min.	
Melting point (crystalline)			347°F.	
Flow temperature		D569	363°F.	

Deformation under load (2,000 psi at 122°F.)	D621	0.5%
Coefficient of linear thermal expansion	D696	4.5 x 10^{-5} per °F.
Taber abrasion (1000 gm. load, CS-17 wheel)	D1044	20 mg/1000 cycles
Thermal conductivity		1.6 BTU/hr./sq. ft./°F./in.
Specific heat		0.35 BTU/lb./°F.
Modulus of rigidity		178,000 psi
Poisson's ratio		0.35
Dielectric constant, 73°F., 10^2-10^5 cps	D150	3.7
Dissipation factor, 73°F., 10^2-10^5 cps	D150	.004
Dielectric strength, short time	D149	500 V/mil
Volume resistivity	D257	6 x 10^{14} ohm/cm
Resistivity	D257	2 x 10^{13} ohm
Arc resistance	D495	129 seconds (burns)

		P Factor at 73° F.:
Permeability:	*Water*	1.9
	Ethanol	0.2
	Freon® 12-114 (20/80)	< 0.2
	Methyl Salicylate	0.3

gms loss/24 hrs/100 in^2 area/mil thickness. Determined on bottles with 35-50 mil wall thickness.

		Room Temp.	122° F.
Resistance to Organics:	CCl_4	1.2	5.7
	Toluene	2.6	2.8
	Acetone	4.9	2.6
	Alcohol	2.2	1.9
	Ethyl Acetate	2.7	2.9

% wgt. gain—12 mo. total immersion Vol. change proportional to wgt. change.

*These values are representative of those obtained under standard ASTM conditions and should not be used to design parts which function under different conditions. Since they are average values, they should not be used as minimums for material specifications.

DELRIN® ACETAL RESIN *offers design engineers a new combination of properties*

"Delrin" acetal resin offers you a combination of properties and potential cost advantages never before offered by any single material. Specific values of typical properties of "Delrin" are listed in the table above . . . and the advantages implicit in these figures have been thoroughly tested in a wide variety of end-uses.

Today is your best opportunity to consider how Du Pont "Delrin" can help you improve the design of a product or develop your designs on new products. Within the next few weeks a new plant to manufacture "Delrin" in commercial quantities will come on stream at Parkersburg, W. Va. This plant is your assurance that your design improvements can fast become practical realities. Commercial molders, already familiar with "Delrin", can provide you with valuable assistance in your problem.

A specialized group of Du Pont engineers, as well, can help you with their experience and knowledge gained during years of market development work with "Delrin". They may well have tested the very product or component you are considering.

FOR MORE SPECIFIC INFORMATION MAIL THIS COUPON

E. I. du Pont de Nemours & Co. (Inc.), Advertising Department
Nemours Building, Rm. 95D, Wilmington 98, Delaware
I am interested in evaluating "Delrin" for the following use:_____

NAME

COMPANY POSITION

STREET

CITY STATE

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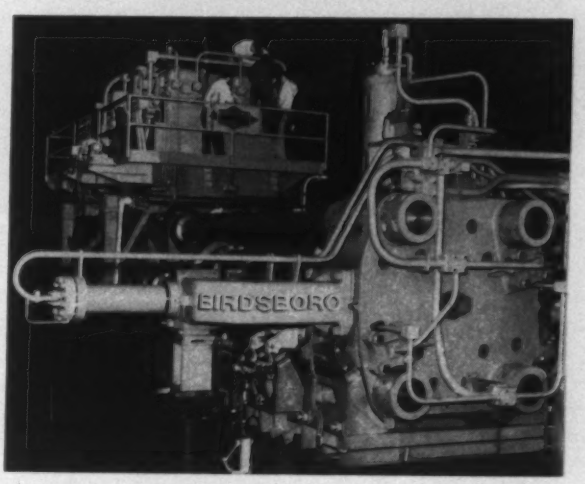
DELRIN®
ACETAL RESIN

DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

Extrusion Presses for aluminum, magnesium, copper, titanium, brass, steel . . . 1,000 to 12,000 tons . . . production primed

by BIRDSBORO

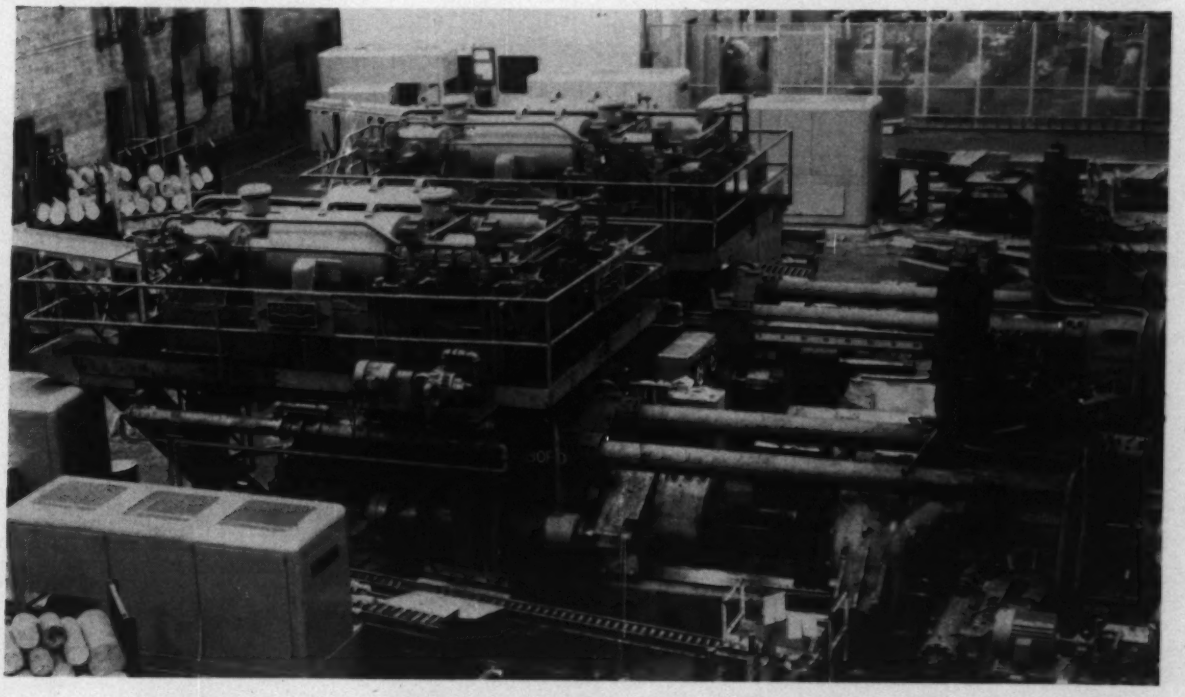


• Engineered to produce profitably for you . . . BIRDSBORO oil or water operated Extrusion Presses have several design innovations that will help you meet expanding productivity schedules for years to come. These versatile presses are capable of producing a broad range of sections and tubing of round, rectangular and irregular shapes.

For example, the press shown to the right is an unusually fast-acting 3,000-ton oil hydraulic extrusion press that substantially reduces dead cycle time. A unique die slide arrangement provides an alternate location for inserting, removing, dressing or adjusting a second die while extrusion continues uninterrupted.

The press shown below is another example. This 2,750-ton self-contained, oil hydraulic four-column aluminum extrusion press is engineered to extrude shapes from billets of 8 to 12 inches in diameter, and up to 32 inches in length.

Contact your BIRDSBORO representative for a more comprehensive picture. *Sales Department:* Reading, Pa., *Engineering Department and Mfg. Plant:* Birdsboro, Pa. *District Office:* Pittsburgh, Pa.



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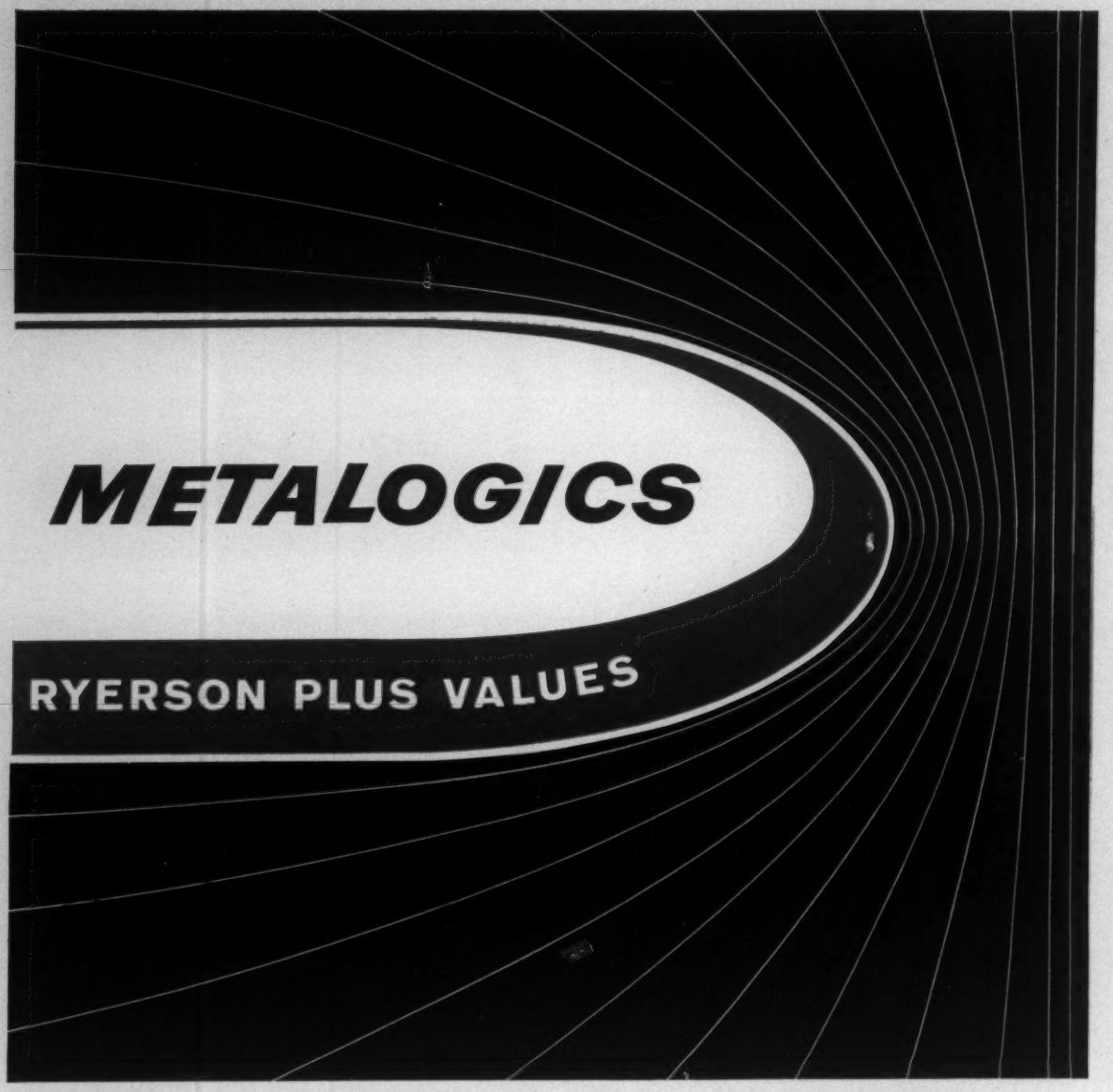

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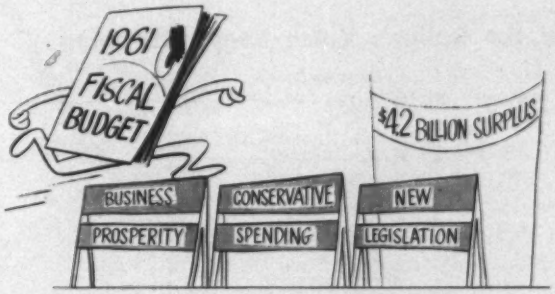
Ike Thinks It'll Clear The Hurdles



President Eisenhower is counting on a $4.2 billion budget surplus in fiscal 1961. To get it, we'll need continued economic prosperity, new legislation, and moderation in spending. Ike predicts U. S. receipts of $84 billion during the fiscal year—$43.7 billion from individual income taxes, $23.5 billion from corporate income taxes, $9.5 billion from excise taxes, and $7.3 billion in miscellaneous receipts. It means corporate tax income must run 35 per cent higher than in fiscal 1959, the year that reflected the recession most heavily. The President thinks gross national product will reach $510 billion in calendar 1960. The new budget requests extension of present corporate and excise tax rates, higher postal rates (including a 1 cent increase on first class and air mail to add $554 million to receipts), and $90 million from boosted aviation fuel taxes. It also demands curtailment of some expensive defense programs. For example, the $137 million appropriated by Congress for Nike-Zeus production will not be spent, if Ike has his wish.

$1 Billion for the Space Race

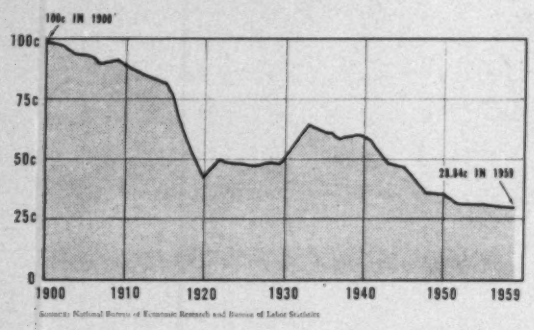
Spending by the National Aeronautics & Space Administration will rise $250 million to $600 million in fiscal '61. High officials of the agency say they have the capability to carry out a bigger program, but lack the money. Defense Department spending on space adds $366 million. New obligational authority for NASA will be $802 million, for Defense space activities about $400 million. With obligation authority only about $200 million above spending, critics say we can't move into space fast enough. (Obligational authority represents money to be spent in future years, not in the year it is voted.) For more budget details, see Page 40.

U. S. Acts to Avert Potential Nickel Shortage

An extra 35 million lb of electrolytic nickel has been placed on the market by Uncle Sam. The move allays fears of a nickel shortage due to heavy demand and the possibility of Cuban nickel supplies being cut off by the Castro government. The General Services Administration is taking orders (in lots as small as 20,000 lb) for 19 million lb of nickel it is releasing, at market price, from the Defense Production Act inventory. Another 16 million lb will be shipped to two producers to replace nickel sinter earmarked for them under

GSA purchase contracts. On Jan. 1, the DPA nickel inventory stood at 137 million lb, more than enough to satisfy demand until International Nickel Co.'s new Canadian facilities (annual capacity: 75 million lb) go into full production in 1961.

How the Dollar's Value Keeps Dropping



This chart shows the decline in the value of the U. S. dollar—a situation that is sure to get worse as an aftereffect of the steel labor settlement. Another cause, notes the U. S. Chamber of Commerce, is excessive deficit spending by the federal government. To check that, the Chamber is urging Congress at this session to keep the highway program on a pay as you go basis, to oppose inflationary increases in the minimum wage, to avoid wasteful defense spending, to eliminate unnecessary spending for public works, depressed areas, community facilities, veterans' benefits, and airport construction, and to reduce monopolistic labor power.

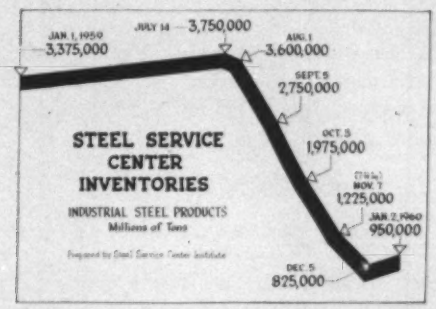
A Big Money Debate Is Shaping Up

The biggest money debate since the free silver campaign of 1896 is shaping up for this Presidential election year, believes W. A. McDonnell, chairman, First National Bank of St. Louis. He lists five "widespread illusions" concerning money and interest rates: 1. That perpetual prosperity can be conjured up simply by creating more money. 2. That rising interest rates are bad. 3. That rising interest rates are inflationary. 4. That high interest rates bring banks exorbitant profits. 5. That either Congress or the Federal Reserve Board, or both, can somehow provide cheap money. He calls on businessmen to deepen their understanding of the free money market system, to spread economic knowledge, and to participate in practical politics.

Steel Industry Steps Up Sales Promotion

Benjamin F. Fairless, president, American Iron & Steel Institute, and Norman W. Foy, chairman, Institute Committee to Promote the Use of Steel, show the Steelmark, now an industry-wide symbol, which will be used in a campaign to promote steel at the consumer level. Manufacturers, wholesalers, and retailers will be asked to use it.

Service Centers Shoot for Full Stocks

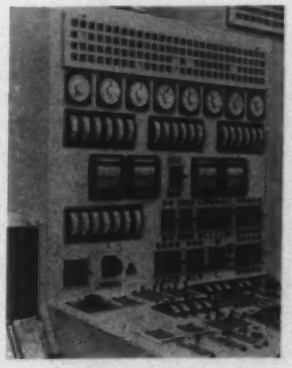


You'll probably be able to get most steel products from a service center by April. Operators think they will have rebuilt their depleted inventories by then. They've already started the upward push. Stocks are around the 1 million ton level (vs. 825,000 in early December). But it'll be past midyear before they reach the normal 3.4 million ton plateau. Stocks of tool steel and stainless have been practically replaced. Cold finished bars, structurals, hot rolled bars, and plates are improving daily. But sheet mill products won't be back into balance until late June or July. Expect service centers to ship about 8.5 million tons of steel this year, for the second best showing in history.

Researcher Builds Tiny Turbojet Engine

A 23 lb turbojet engine—claimed to be the world's smallest—was unveiled last week by Williams Research Corp., Walled Lake, Mich. Earlier, the firm announced the development of a lightweight, gas turbine engine using the heat exchange principle and demonstrated a small pleasure boat powered by a gas turbine. The new turbojet, which produces 70 lb of thrust, may fill the helicopter industry's need for an engine small enough to be mounted on the tips of rotor blades. Another experimental application will be in light airplanes; the engine is small enough to submerge in the wing contour and cheap enough to permit the use of several units per aircraft.

A Boost for Automation



This is a section of the control boards for the data logging and computer system installed by Control Systems Div., Daystrom Inc., at the Louisiana Power & Light Co. The complex system has operated virtually nonstop for the last six months. Thomas R. Jones, Daystrom president, says it means that "widespread automatic control of industrial plants is not far away." The utility system: 1. Monitors 350 points—involving temperatures, pressures, and flows—to determine whether they are within preset limits. 2. Sets off an alarm if they're not. 3. Identifies and locates the cause of the trouble. 4. Indicates time, location, and magnitude of the deviation. 5. Prints the value of many variables at regular intervals. 6. Types out, on demand, any measured or computed variable.

GE Researcher Scores Breakthrough in Data Storage

You may soon be able to push a button to place at your fingertips any information in your files—which could contain considerably more than they

now do. The key is thermoplastic recording, a process invented by Dr. William E. Glenn, a GE physicist. His device records so fast, and in such a small space, that all 24 volumes of the *Encyclopedia Britannica* could be put on a reel of tape the size of a typewriter ribbon spool in about 24 minutes. The system, still under development, converts information into microscopic wrinkles in a plastic material. An extremely fine electron beam "carves" information and artwork onto the plastic tape. Data are played back in a manner similar to ordinary movie film projection.

PAs Report Better Business

Here are the findings of a new survey by the Purchasing Agents Association of Chicago: Production is turning upward . . . order backlogs are improving . . . leadtime on purchased materials has been shortened . . . employment is stable . . . inventories are being built rapidly . . . prices remain strong . . . venders are giving faster deliveries . . . 20 per cent of the responding firms are operating at above normal rates; another 56 per cent are operating at normal or near normal rates; 24 per cent are running at less than 75 per cent of normal.

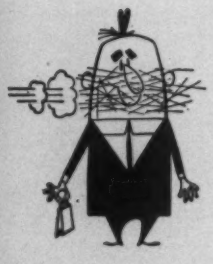
Aluminum Bids for Big Highway Market

About 800 million lb of aluminum may go into highway products this decade, believes Robert J. O'Grody, highway market manager for Reynolds Metals Co. He says aluminum can be found in one or more highway applications in every state. Most common: Signs, lighting standards, bridge railings, chain link fence. More than 7 million old highway signs must be replaced each year.

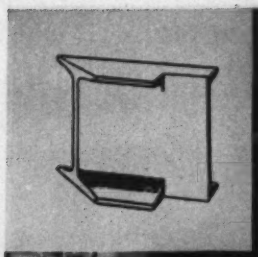
Some Strikes on Steel Scene Still Possible

Smoke still rises from the steel negotiations scene. National Labor Relations Board officials were counting ballots late last week on the "last offer" vote of several firms. Among them: Pittsburgh Steel Co., where settlement was snagged by incentives, and Acme Steel Co., Chicago, where work rules were the issue. Pittsburgh Steel, the only major steel firm to lose money in 1959, claims its incentives have boosted payroll costs 46 cents per hour higher than the industry average. Officials want a revision—only 23 per cent of the workers would be affected. Acme Steel has agreed to the basic terms of the major settlement, but the union is demanding that a 2B clause be added to the contract. "We don't want it," say officials, "but we are willing to set up a committee to study the problems that can't be solved." The Taft-Hartley injunction expires tomorrow.

Straws in the Wind



Aluminum Co. of America will start up its smelter at Warrick, Ind. (annual capacity: 150,000 tons) in June . . . Henry Kearns, assistant secretary of commerce for international affairs, has promised a hard sell approach in official exhibits scheduled for 14 countries this year . . . Internships and residencies in engineering, somewhat comparable to those in the medical profession, are being called for by the University of Michigan's Prof. William G. Dow, to meet industry's need for skilled engineering specialists.



COPING AND MITERING HEAVY STRUCTURAL SHAPE

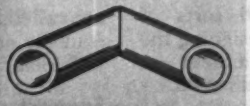
18" Beam (above) is held between vises for the short cut. On the long cut (left) vises were removed and beam held by simple clamp. The MARVEL Band Saw is truly indispensable in ornamental and structural iron shops where this type of work is done daily. The machine will cut-off square, miter and cope any work shape from the smallest moulding to 18" I-beams.

SPLITTING CLAMP RINGS, BUSHINGS

Splitting clamp rings, connecting rods, bushings and collets is a fast, simple operation on the No. 8 Band Saw. Perfect control, quick chucking facilities, accuracy and speed are features that especially fit the machine to handle this type of work.

MITERING LARGE DIAMETER PIPE

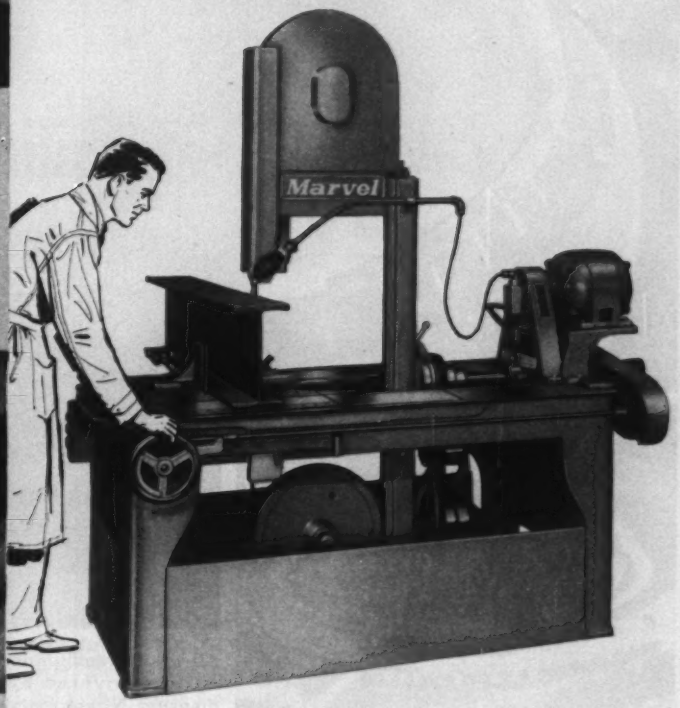
Pipe (or any bar shape) may be mitered at a 45° angle without the need for special jigs or fixtures. Even when cutting miters, work remains in the same position as it does for straight cuts. Column and blade are instantly tilted to desired angle, even without stopping the machine. Perfect miters (or lesser angles) are sawed without any layout or special equipment.



SEGMENTING LARGE DIE BLOCK

Three equally spaced re-entrant cuts were made in this 16" x 18" SAE 4130 Forging. Job was completed, floor-to-floor in 5 hours. No special jigs or fixtures were required. An unusual job that serves to emphasize the versatility of the MARVEL No. 8 Saw.

"The One Machine We Couldn't Do Without"



"As simple to use and handy as a Scout Knife" is the way another user described his MARVEL No. 8 Universal Band Saw recently . . . and we can't think of a better way to describe this versatile metal cutting machine.

With a MARVEL No. 8 Band Saw, you can do almost any conceivable straight, angle, or miter metal sawing job—from cutting-off bar stock to making the most unusual forming cuts. You can handle small, delicate work, and in the next minute, saw structurals, or segment large work as illustrated in the lower photograph. You will save time, labor, and material with a MARVEL No. 8 Band Saw because no other saw has all the features to be had in this truly universal tool.

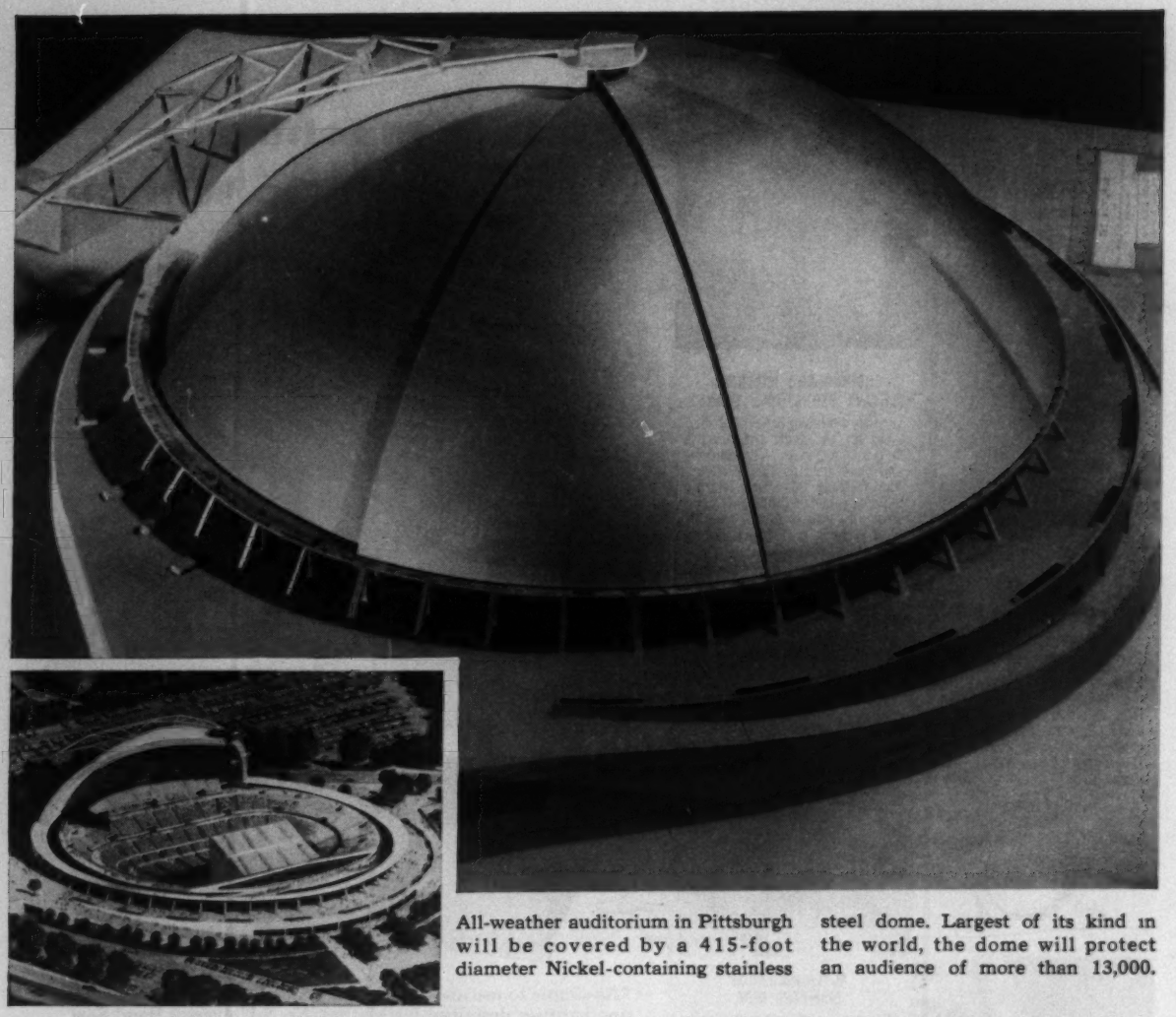
Upright column design and forward travel of the blade through the work (which remains stationary on the table-height saw bed) provides easy, unobstructed visibility and more convenient and efficient working conditions; column can be tilted and locked at any angle up to 45° left and right of vertical; the exclusive MARVEL Power Feed with Automatic Overload Relief; Automatic cutting-depth stops; simple, convenient operating controls—these are some of the features which make the No. 8 Band Saw the most useful—and used—metal cutting saw on the market.

For the complete story, ask or write for Bulletin 875 which illustrates and describes MARVEL Universal Metal Cutting Band Saws.

MARVEL *Metal Cutting* **SAWS**

Better Machines-Better Blades

ARMSTRONG-BLUM MFG. CO. 5700 W. Bloomingdale Ave. • Chicago 39, Ill.



All-weather auditorium in Pittsburgh will be covered by a 415-foot diameter Nickel-containing stainless steel dome. Largest of its kind in the world, the dome will protect an audience of more than 13,000.

"Push-button umbrella roof" of stainless steel gives Pittsburgh a new all-weather auditorium

Watching a play or listening to music under the stars heightens the enjoyment. That is, until a passing shower comes along to wash out the fun. But now comes a new idea in auditoriums. In this one, an umbrella roof of Nickel-containing stainless steel will close at the first drops of rain—and on with the show.

It's a simple concept, but a daring one. Eight huge sections nest together when the dome is open. Push a button, and six of these sections glide quietly together around an outside track.

They looked into all sorts of sheathing materials in designing the dome before choosing stainless — a Nickel-containing stainless steel.

For stainless with Nickel in it is one of the most weatherproof metals there is. It is corrosion-resisting all the way through — in salt air as well as industrial atmospheres. What's more, it's virtually self-cleaning — rainfall alone keeps this metal clean.

No wonder you see Nickel-containing stainless wherever strength, long life and handsome appearance are called for! Not only in buildings — inside and out — but everywhere you look.

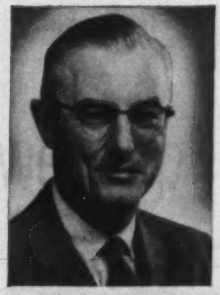
Suggest something to you? Can stainless help you solve a problem involving corrosion, stress, appearance, temperature extremes? The way to find out is to write us. We'll see if Nickel-containing stainless steel — or some other nickel alloy — may be just what you're looking for.

THE INTERNATIONAL NICKEL COMPANY, INC.

67 Wall Street INCO New York 5, N. Y.

INCO NICKEL

NICKEL MAKES ALLOYS PERFORM BETTER LONGER



Mobilize for Efficiency

The new nudge given metalworking employment costs by the steel wage settlement accents the need to sharpen production efficiency by all possible means.

Production efficiency is a many splendored thing. It can be bolstered by superior product design, by better materials, by improved processes, and, of course, by higher worker productivity.

The easiest and largest gains will come through use of the most modern machinery available. Productivity studies prove that.

Or look at foreign countries which are becoming formidable competitors for world and domestic markets. Metalworking industries in Western Europe and Japan have stepped up their efficiency, their production, and their quality via modern plant and equipment. Their equipment is often of U. S. design, or a reasonable facsimile thereof.

Western Germany has been able to boost money wages to its workers an average of 7½ per cent annually over the last decade. Use of modern production machinery has enabled it to hold unit labor costs and price increases to 2 or 3 per cent a year over the same period.

U. S. builders of capital equipment are making major breakthroughs. Machine tool builders, preparing for their exposition in Chicago this fall, have developed or are developing machines that produce more goods, to closer tolerances, at lower cost.

Metalworking companies are planning larger equipment expenditures ($5.65 billion) this year. They need four times that much to cash in on optimum production efficiency.

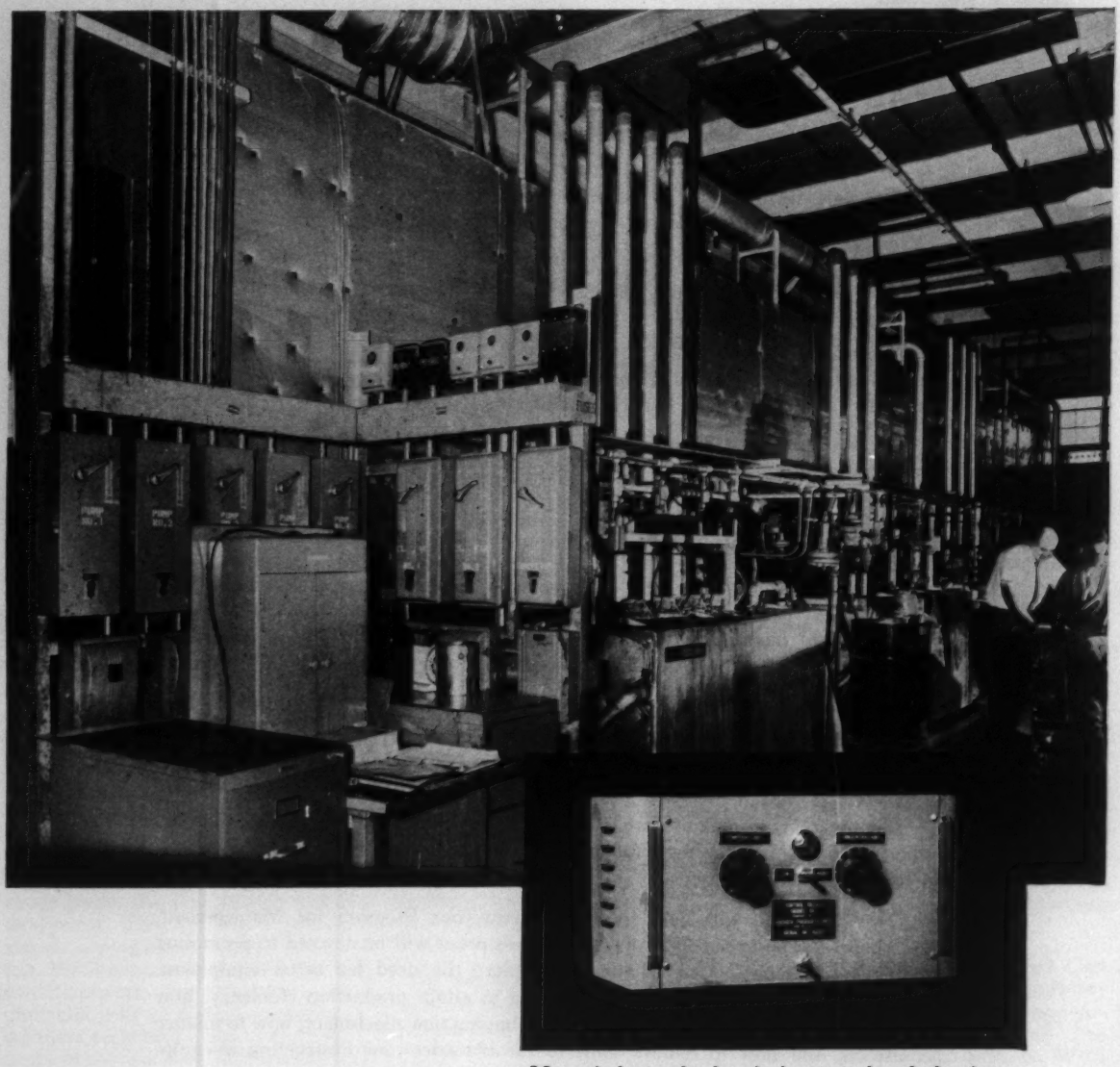
This magazine will help too. This year, our Program for Management, long one of the best read series in the business press, will be devoted to promoting production efficiency. Our editors will explore the need for better equipment, how to sell workers on the need for helping to attain production efficiency, how to sell financial management on the value of buying new machinery, how to finance acquisition, and how to remove some of the obstacles now obstructing re-equipment.

We believe that production efficiency is our greatest problem. In fact, it may be our only salvation.

Walter J. Campbell

EDITOR

AMCHEM AUTOMATION...a new



Many industry leaders in iron, steel and aluminum fabrication are already employing AMCHEM AUTOMATION to provide unmatched product protection and gratifying production savings to these products—aluminum siding, appliances, venetian blinds, fluorescent lighting fixtures, aluminum sign blanks, steel office furniture, automotive trim, aluminum windows and doors. Give your product the same protection, the same kind of savings — with AMCHEM AUTOMATION!

concept in chemical conversion coatings assures you constant, uniform quality, actually saves you money!

AMCHEM AUTOMATION means new standards of protection for your metal products with actual black-and-white savings in time and money you can't afford to ignore!

AMCHEM AUTOMATION takes the human element out of your conversion coating processing—replaces it with 100 percent electronic line control that virtually assures you of constant, uniform quality. Rejects due to faulty bath control plunge to new lows. Product assembly moves faster through inspection as AMCHEM AUTOMATION guards quality round-the-clock!

AMCHEM AUTOMATION releases quality control personnel to other duties, builds employee morale and pride in their work. AMCHEM AUTOMATION watch dogs chemical replenishment—bath is never overloaded or under strength. You reap big savings in time, labor and chemical costs!

AMCHEM AUTOMATION can be yours right now for metal pre-treatment and protection on a variety of fabricated products. Just say the word, we'll have an Amchem Automation Coordinator—a specialist in electronic line control—fill you in on all the time, money and labor saving details!

AMCHEM

AMCHEM PRODUCTS, INC.

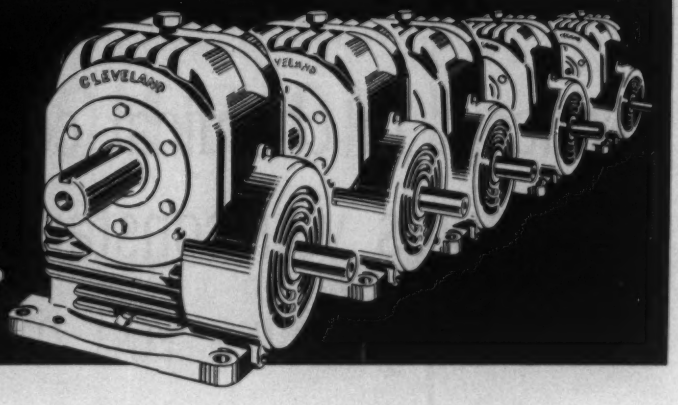
(Formerly American Chemical Paint Co.)

First in automated chemical conversion processing

AMBLER, PA. • Detroit, Mich. • St. Joseph, Mo. • Niles, Calif. • Windsor, Ont.

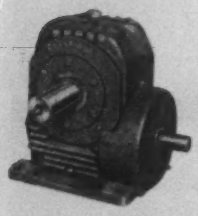
Amchem is a registered trademark of AMCHEM PRODUCTS, INC.

Why do these new Clevelands carry higher horsepower ratings?



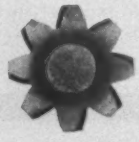
It's because Cleveland design engineers — drawing on 47 years of experience — have successfully blended the *just right* combination of housing design, exclusive heat-treatment for alloy steel worms, centrifugal casting of bronze gear rims together with larger, more rugged taper roller bearings on worm and gear shafts.

This permits substantially higher horsepower ratings with smaller worm and gear units — units that more than meet AGMA's new Standard 440.03. Cleveland now offers speed reducers — from one to forty horsepower — at savings of 50% or more on cost per horsepower.



HOUSING is a rugged one-piece design of highest quality cast iron, ribbed for maximum strength and heat dissipation. Cooling fan of unique design is mounted on *input* end of worm shaft and is equally efficient in either direction of rotation. Only one gear shaft bearing plate is large enough to permit assembly of the gear. On gear shaft extension side, gear shaft bearing is mounted in the housing bore and backed up by a clamping plate. This gives a stronger housing and provides maximum strength for overhung loads. Housings are designed for mounting in one position only, thus avoiding design compromises necessary with *universal mount* types.

BEARINGS on both worm and gear shafts are Timken taper roller-type, providing adequate thrust and radial capacity. Worm bearings are mounted directly in housing bore for greater rigidity.



WORMS are cut integral with shaft and accurately ground to a high surface finish on both thread flanks. Shaft extension diameter is especially large to permit increased overhung load capacity. An exclusive heat-treating technique provides a high degree of hardness throughout the entire thread thickness and well below the worm's root diameter. It gives maximum thread strength and resistance to wear without losing the advantage of a tough core of medium hardness.

GEARS have centrifugally cast bronze rims with a high tin-nickel content. They provide greater density and a higher hardness, giving increased resistance to wear and fatigue pitting. Bronze rims are centrifugally cast integral with cast iron centers, in smaller sizes up to 6 inches, which permits strong mechanical keying of the two parts — without dependence on actual surface bond. Gear shaft extension diameters are especially large to permit greatly increased overhung load capacity.

ORIGINAL MASTER WORMS for each size and ratio of worm gearing, are made individually in Cleveland's tool room to extremely close tolerances and kept in perpetual stock. Cleveland makes all their hobs. No outside source has been found that can produce worm gear hobs to their exacting tolerances and standards. Each hob is checked against this master worm — as are production worms and gears. Thus, it's not necessary to ever replace Cleveland worms and gears in sets. A new gear will operate perfectly with an old worm and vice versa.

Call your Cleveland Representative today, to get all the facts on these new, more powerful speed reducers. Or, write for a copy of new, free Bulletin No. 405 giving complete engineering information.

The Cleveland Worm & Gear Company,
3270 E. 80th St., Cleveland 4, Ohio.

A subsidiary of
Eaton Manufacturing Company

CLEVELAND
Worm Gear
Speed Reducers

Affiliate: The Farval Corporation

What Steel Settlement Really Means to You

THREE WEEKS after the steel settlement, its costs and effects on the 100 steel producers and their 600,000 employees are well analyzed. Yet to be measured are its effects on the 70,000 metalworking plants and their 7,000,000 workers, not directly involved but vitally affected.

We know steel costs will rise. Other wages will rise. Metalworking will again be caught in the pincers. The steel settlement not only was a defeat for steelmakers, but it was a battle lost for all metalworking.

But one battle does not make a war. Let's start from where we are and see what must be done. To help you plot your course of action, the editors of STEEL suggest the following.

—Walter J. Campbell

GEORGE HOWICK fears—

Inflation Goes into Orbit

ANOTHER damaging round of inflation. That's the price for peace in steel. Expect the boost in the industry's employment costs to have these repercussions:

Steel prices will rise. Some extras and premiums may be jacked up by midyear. A sizable boost in the base price can be expected in December. We'll probably witness another price hike in late 1961 when the third major segment of the labor package goes into effect.

Before the settlement, the average labor cost per ton of finished steel produced was $59.20—based on 16 manhours per ton. The cost now is $60.90—due to pension and insurance improvements in the new contract. When the first wage hike goes into effect on Dec. 1, the cost will climb to $63.25—assuming that the full cost-of-living increase must be paid. On Oct. 1, 1961, the cost will shoot to about $65.50 per ton as the final wage increase becomes effective. So the settlement will boost steel labor costs an average of $6.30 per ton of finished steel.

Any increase in steel labor costs sets off a chain reaction of inflation that finds its way back to the steel companies in the form of higher prices for materials, supplies, freight, services, equipment, even taxes. Steel industry analysts report that every $1 increase in employment costs is followed by a $1.50 advance in the industry's other costs. That indicates the settlement will really add $15.75 to the cost of making a ton of finished steel. Another rule of thumb is that a penny rise in labor costs adds 40 cents to the cost of making a ton of steel. So the 40 cent package would boost steelmaking costs $16 a ton. Since the industry's earnings averaged only $9.56 a ton in 1958, steel prices will have to be lifted substantially.

Prices of other products and services will rise. The settlement sets a pattern for other industries. They, like steel, will then have to boost prices.

But you can offset the effects of the wage-price spiral at least partially. Countermeasures include:

1. Boosting production efficiency.
2. Trimming material costs.
3. Preparing for increased costs but being sure not to overanticipate the amount of inflation that lies ahead.
4. Ascertaining your true costs and basing price action on them.

BOB JAYNES predicts—

Production Records in '60

BUSINESSMEN held their breath during the steel labor difficulty, but once the settlement was reached, they let it out with a rush, signifying the boom that steel peace assures for 1960.

The big "IF" in glowing yearend predictions has been removed, and the basic conditions for their fulfillment have, if anything, been strengthened. The steel settlement is sure to put upward pressure on other wage negotiations throughout the year, resulting in a significant increase in personal income. In addition, overtime and incentive pay will climb as the boom develops. It means the consumer will have more to spend this year—perhaps $20 million to $25 million—than ever before.

The steel settlement should also help industry jell some of its capital spending plans. With the assurance of ample steel supplies, plant modernization and expansion plus equipment purchases should reach $38 billion to $39 billion.

Such demand will spur production indexes to new highs. The Federal Reserve Board's revised industrial production index will climb at least 8 per cent above the 1959 average to about 172 (1947-49 = 100) for the year. With the threat of another steel strike removed, the trend line may be more level than previously expected, but the peak still will be reached in April or May. STEEL's own index will likely top out near 190 (1947-49 = 100) in late spring, dip seasonally early in the third quarter, then return to the first quarter level in the last three months.

But prosperity will cost more because of the steel settlement. When the original forecasts for 1960 were made, a modest increase in price indexes—1 to 2 per cent—was foreseen. Depending on how successful industry is in keeping down its prices in the face of higher manpower costs, and other boom pressures, inflation could rise 2 to 4 per cent by the end of the year. So STEEL's earlier estimate of $510 billion for the gross national product in 1960 could be conservative.

But don't let good times dull your business acumen. Keep a close watch on your inventories of raw materials and finished goods. While they must be high enough to sustain 1960's level of business, remember that overstocking is not only expensive but dangerous. Since World War II, every period of excess inventory building has been followed by a period of adjustment which has cut deeply into metalworking profits.

BRIAN WILSON finds—

Competing Materials Hold Own

PRICE ALONE won't trigger a significant switch from steel to competitive materials. It is only one of several checks and balances.

First, inflationary influences in the steel industry will tend to be canceled by inflationary influences in competing industries.

The copper industry, for example, has a new labor contract that is comparable to steel's in terms of inflation. Because of the resulting wage-price squeeze, it's unlikely that you will see the price of copper go below its current level—33 cents a pound.

The aluminum industry recently put through a price hike of 1.3 cents a pound, and more boosts seem to be on the way: The industry is still absorbing the added cost of new wage increases.

The price of zinc has been boosted three times of late, and it could go higher.

Second, price is often offset by other considerations. They become important when the price spread between competitive materials is narrowed.

For example, a price increase in steel could give aluminum an edge on jobs where a lot of work is required to convert the as-received material into a finished product. Under the circumstances, labor costs could swing the balance in favor of the light metal.

Conceivably, a price increase in stainless pipe could help the cause of polyvinylchloride pipe because plastic prices are trending downward. But, again, price alone is not the controlling factor.

What can be done to help give your material a competitive advantage?

Three broad approaches are suggested: Do a better job of promoting your product. Do a better job of developing new uses. Do a better job of day-to-day selling.

BILL WALLACE warns—

Guard Against Overstocking

ALL THE STEEL you want will soon be yours for the asking. Producers are out to recoup their strike losses in a hurry by shipping maximum tonnage in a record breaking first half.

Look for industry operations to average about 95 per cent of capacity through June. Steelmakers will pour about 70 million ingot tons and ship 51 million tons of finished products. You can expect record shipments of sheets (hot rolled, cold rolled, and galvanized) hot rolled bars, tin plate, and stainless steel.

There's ample capacity for every product, and no distortion of demand such as we had in 1955 (when autos and appliances boomed the sheet market) or in 1957 (when the emphasis was on plates and structurals for construction, freight cars, and capital equipment). This time, consumption is more uniform. There's a need to rebuild inventories across the board.

Current inventories of finished steel products (about 10 million tons) are half their normal size. By May, most users will have reasonably good stocks, but since demand for flat rolled products will still be strong, a "feeling" of shortage will persist. And therein lies the danger. Having rebuilt their stocks to 20 million tons, users may go to 25 million—a size that invites liquidation. That's what they did after the 1956 strike, despite the assurance of labor peace for three years. Result: A drastic cutback that began in July, 1957, and lasted for a year.

Higher steel prices are inevitable, but there won't be too much pressure for immediate action. Reasons: 1. Record first half shipments will assure good profits for most steelmakers during that period. 2. The full impact of higher first year costs won't be felt until Dec. 1, when wages are raised. Across-the-board boosts in quotations are unlikely until wages go up. In the meantime, you can expect selective increases—many in the form of higher extras. And don't be surprised if some geographically isolated steelmakers decide to quote premium prices.

BILL DEAN urges—

Bargain on Your Own Grounds

ALERT MANAGERS are already planning their 1960 bargaining strategy. It's the logical first step in countering the wage-price squeeze touched off by the steel settlement.

Flushed with the taste of victory, unions will be tough to deal with. The hourly wages of most metalworking production workers (ranging from $2.32 to $2.62) are well below those of the steelworkers. In direct wages, you'll be hard pressed to settle for less than 7 to 10 cents per hour.

But the best opportunities for controlling costs of the contract package lie in the fringe benefit and "hidden cost" provisions. Analysis of the new steel pact, as well as past bargaining patterns, suggests four guideposts for companies with upcoming labor negotiations.

1. Don't slavishly follow the steel settlement. Trying to match its insurance and pension grants could be an indigestible bite for older firms that have prided themselves on keeping turnover to a minimum. The big factor: Average age of the work force.

Take the lump sum retirement benefit averaging $1500. Suppose a firm employing 300 has 25 workers ready to retire in 1960. It would cost the firm over 6.2 cents per hour per employee to grant this benefit alone.

2. Don't get trapped by clauses—like the infamous 2B—which will hinder or even prohibit you from adopting cost cutting procedures or modernizing to boost productivity.

3. Fasten a lid on benefit costs which could increase substantially over the life of the contract. Follow steel's example: Limit the cost-of-living adjustment (3 cents), and check the method it devised to offset insurance cost increases by reducing the cost-of-living factor. Some first set a cost limit on insurance and provide for the payment of any premium increases by employees.

4. Study your contract clause by clause, analyzing each in terms of cost. Provisions dealing with discipline, seniority, grievance procedures, union committees, and work standards are good hunting grounds for hidden costs.

Preparation! That's the heart of bargaining. Everything in the contract costs money. There are no "noneconomic" clauses.

DON POSTMA reports—

Users Fight Cost Spiral

PRICES of consumer hard goods like automobiles and appliances will soon start to show the effects of the steel labor pact. The cost margins between steel and competitive materials like plastics will shrink. And imports will gain a firmer toehold on domestic markets.

Take automobiles. Detroit will have to anticipate how much the higher cost of steel will add to what it must charge for its 1961 chariots. Each penny in base material costs is tripled, sometimes quadrupled, as steel passes from one operation to another on its way to the final assembly line. In 1957, average car prices were 7.17 per cent higher than they were in 1956. They gained 3.35 per cent in 1958 and edged up another 2.65 per cent in 1959. Although automakers held the price line on 1960s, it would be unrealistic to expect less than a 2.5 per cent markup on 1961 models. It means that a $2000 compact car like Corvair will cost $50 more this fall.

Inherent advantages of competitive materials will become more important as steel prices gain altitude. In 1956, carbuilders paid 2 cents a foot for 18,000 miles of $\frac{3}{8}$ in. steel tubing for passenger car fuel lines. Extruded nylon tubing cost nearly 7 cents a foot. Today, nylon tubing runs 4.5 cents a foot in automotive quantities vs. 2.5 cents for steel. The less flexible metal tubing also costs more to package and install. So a steel price increase could open the door for nylon fuel lines.

The outlook for imports is also improved. Simca's Elysee and Ford's Falcon are priced $14 apart now. Next year the difference will be closer to $65. To economy minded buyers, it could be enough to tip the scales in favor of the French entry.

To combat such predictable events, you'll need fast, versatile manufacturing methods like explosive forming, diecasting, and impact extrusion.

You'll have to consider the extension of quality control to the reliability stage to cut rejects, eliminate waste, drive down costs. You'll demand engineers who can design for cost competition because it's the final price that counts, not the bare cost of raw materials.

Such tactics can add ballast to inflation's balloon.

JACK BOTZUM advises—

Tell and Sell the Government

LIKE THE MAN who came to dinner, the government is in collective bargaining to stay. Even with a supposedly sympathetic Republican administration in office, the steel industry was pressured into an unwelcome contract. The U. S. may not move directly into your bargaining as it did in steel, but it does so indirectly because the big negotiations in which it participates set the patterns that affect you.

What can be done?

Keep the government out? For obvious reasons, unions welcome U. S. participation. As powerful and influential as steel management is, it couldn't keep Vice President Richard Nixon and Labor Secretary James Mitchell from intervening.

Influence government more effectively? This is the best answer. Corporations are handicapped by the companies-don't-vote-but-union-members-do refrain, yet you can show many an example of how union members don't always vote the way labor leaders want them to. Also effective is the argument that national welfare is frequently served when business welfare is furthered. But how can the points be put across?

Commerce Secretary F. H. Mueller suggests:

1. Do deeper thinking on public questions.

This means doing the homework first, before shooting from the hip with stereotyped ideas.

2. Speak up oftener on vital issues.

Let's hunt opportunities to be more vocal. Write letters, circulate printed material, make speeches, give press interviews, face radio-TV panels, testify at hearings, brief congressmen, telephone governors, buttonhole mayors.

3. Play a bigger role in public affairs.

Business insight and talent are urgently needed to help better the business climate.

4. Encourage political action by young people.

Recruit them early in the defense of free enterprise. Junior executives should be given leaves of absence to serve in public office.

HARRY CHANDLER finds—

Hidden Exports Rob Us

THE IMPACT of the settlement on export and import markets will hurt the most in two broad areas:

1. We stand to lose more domestic and export markets to standard products of foreign origin which are sold on price alone—such as barbed wire, woven wire fencing, and nails. But we can continue to make gains at home and abroad where we have a competitive edge in quality. And we can continue to enjoy several inherent advantages in the domestic market place, including language, geography, and the opportunity to keep in close touch with changes in consumer needs. Those factors are of prime importance if products are tailormade. For example, they would seriously handicap Japanese steelmakers competing for sheet sales to the U. S. auto industry.

2. Our aggravated wage-price problem is bound to accelerate "hidden" exports which rob us of production capacity, weaken our defense potential, take jobs away from our labor force, and diminish tax revenues. The danger is pointed up in a survey by the National Machine Tool Builders' Association. Forty-seven per cent of the respondents (representing more than 75 per cent of our domestic machine tool capacity) have made manufacturing arrangements abroad, or plan to. No wonder! A machine that costs $10,000 to build in the U. S. can be produced in West Germany for $6250.

What can you do to gird your company's capacity for competition?

You can hit foreign competitors where they live by stepping up your research and development of new products. Most successful imports are copies of U. S. originals, made with cheap labor and sold at bargain basement prices. The challenge: Create good, new products that aren't being made, as yet, by your foreign competition.

You can steal a giant step on foreign competition by taking full advantage of the fact that you are in the best position to be alert to your customer's present and future needs.

Two questions for our government:

Will the day come when you will have to help U. S. industry maintain and develop export markets—as many foreign governments are doing now?

When will you stop giving it away and start selling it?

VANCE BELL asks—

How Much Steel Expansion Now?

WILL the new labor contract shove the industry into such a disadvantage with competitive products and imports that steel plant expansion will be markedly curtailed?

Expansion will continue, but its pace may be braked by the settlement and market developments. We have lost a sizable chunk of the world market for iron and steel and products made of them.

Our expansion needs now depend almost wholly on our share of the domestic market (which is still huge by any standard). Two other factors pattern the outlook: An increasing population (it's growing by 3.5 million people a year) and the gradual rise in our standard of living.

As other countries mechanize and compete in the world market, there will be a growing tendency for goods to be made where they can be produced for the lowest delivered price to the consumer. The U. S. steel industry has already lost much of its barbed wire, nail, and reinforcing bar business to foreign producers.

How can the U. S. steel industry square up to the challenge for markets?

1. Consider building plants abroad, or buying into foreign companies instead of abandoning markets in which imports make big inroads.

2. Win your customers' allegiance by focusing more emphasis on tailormade steel, by assisting them with their metallurgical and application problems, and by giving them prompt deliveries.

3. Develop new products. (Example: U. S. Steel Corp.'s vinyl coated sheets.)

4. Be on the alert for new plant sites that offer market opportunities and economic advantages.

5. Intensify your search for new processes and equipment that boost productivity.

6. Continue the fight to change work rules that limit productivity.

BOB HUBER believes—

Equipment Can Offset Wage Rise

BETTER purchase and use of equipment are two of your most effective counterattacks against the expected aftermath of the settlement.

If your productivity doesn't rise 3 to 5 per cent a year, you'll be in trouble. Better equipment is the quickest way to bring improvements of that order. A STEEL survey shows that metalworking would have to spend $20.7 billion on capital equipment to achieve optimum production efficiency. This year, we'll fall $15 billion short of that mark. But the $5.65 billion we do plan to put into machinery this year is itself a record.

You'll gain full mileage from that money if you:

1. Know what you need now and in the future.

Force your production methods and equipment to prove their supremacy over alternates. Mark for improvement or replacement all that don't stand up under the challenge. Take advantage of market studies, sales predictions, and your designer's forecasts to know what methods you'll need three, five, even ten years from now. The equipment you buy today will have to last a while. Rank your equipment needs in order of urgency; then spend what you can afford.

2. Challenge the design of your products. Look for ways to make them easier to manufacture. Loosen tolerances, simplify contours, and eliminate special requirements where possible.

3. Delegate full responsibility for finding better manufacturing techniques and equipment.

A man with only half the responsibility will do only half the job.

4. Seek new uses for new, unconventional metalworking processes that can help bypass restricting union agreements.

Explosive forming, chemical milling, and electron beam welding are among the methods that may help you leap ahead in production efficiency.

The penalty for failure to do a good job: Profit starvation.

And the payoff for success: Survival and gain despite world and domestic markets that are increasingly competitive.

ED CASE stresses—

Improved Materials Efficiency

MATERIALS EFFICIENCY is now one of the few open roads to cost improvement. Prices will go up, but your suppliers and your engineering-purchasing team can help you offset increases in materials. As the net result of such efforts, you can also soften the blow of rising labor costs.

Here are some decision areas in which you can cut pounds and dollars out of costs:

- Make or buy? It may pay to reweigh the advantages of buying standard components, of making specials.
- Will substitutes help? Don't overlook such alternates as new, strong alloys, plastics, nonferrous metals.
- When you buy steel, what's the most economical form? Shapes, tubing, and extrusions, for example, may offer a lower net cost even though they are more expensive per pound than the forms you are using.
- How can you reduce replacements? Expensive materials in plant equipment may help you economize in terms of replacements, downtime, and service costs.
- Where to buy? You can bet that the spread between domestic and foreign materials will get wider, but does price alone outweigh longer shipping times, lack of service, uncertain delivery dates, uncommon specifications? And how's your economic patriotism?
- Will it pay to recheck specifications? One company found it had based its specifications on a supplier's data that were 20 years old—and the material was no longer standard. The first remedial step, changing to a standard, brought a saving of more than 10 per cent. Then the company did more checking. It was able to save another 6 per cent by combining several similar grades and ordering in larger quantities.
- Should you formalize materials efficiency? The important thing is to get on the ball now. Work closely with your suppliers; give engineering and production the needle. In time, your formal program will evolve.

JOHN MORGAN suggests—

Try Marketing on Work Rules

STEEL LOST the battle of work rules because:

1. The issue came to the bargaining table with poor advance introduction.
2. The issue had to be dealt with in an atmosphere of hot temper and pressure.
3. The issue is not readily negotiable even in the best atmosphere.

Work rules—and ar[illegible] industrial relations matter—have to be sold to the workers, their neighbors, government officials, customers, shareholders, and other businessmen. Steel was successful only in winning the approval of the last three.

If work rules had been a problem in marketing, steel erred in selling the engineer but not the purchasing agent.

Yet can you adapt marketing procedures to industrial relations problems? Many firms have.

Good marketing is based on good research, product planning, and selling.

Similarly, good industrial relations require:

1. Research to learn what your workers and other interested parties want.
2. Planning to make your program as acceptable as possible to all.
3. Selling the year around to convince as many as possible that you merit their approval.

Companies which market their industrial relations learn from research that their employees (and the other interested groups) want:

1. The basic material reward to come voluntarily and amount to what's right in pay, benefits, working conditions.
2. The extra human satisfactions in important work, respect for dignity, full information as to what's going on and what's ahead, participation, and recognition.
3. The assurance that good jobs with good pay and other attractions are the result of efficiency.

Steel didn't satisfy those three "wants" in its approach. That's why the work rules battle was lost, but the war goes on to eliminate featherbedding that's wasting 25 per cent of all America's productive efficiency.

Bargaining failed with work rules. Let's try marketing.

IRWIN SUCH sees—

Challenge in Lost Battle

OF COURSE, the steel settlement is inflationary—but not as inflationary as you may think.

It should not be the signal for unreasonable wage and price increases in other industries.

Metalworking managers must also accept the fact that the settlement sets up a chain reaction of major problems that must be met head on if we are to win the battle of the market place at home and abroad.

A number of trouble spots that lie ahead have been spelled out and analyzed by STEEL's editors on these pages. They also suggest remedial action that can be taken. But we can only go so far.

Each company has its own specific problems for which its own managers must work out tailor-made solutions.

You'll need help, naturally. And we think some of it will come naturally.

Despite the steel union's victory, the fight gave all organized labor a shock.

- The events in steel showed that the public holds the unions at least partially responsible for inflation. Labor leaders may temporize their demands in the coming months.
- The events in steel showed that the nation is more fully aware of the evils of featherbedding. Steel lost on the issue partly because of weak tactics, not because of weak belief in its cause. But even so, labor may recognize the wisdom of voluntarily improving work practices.
- The events in steel brought home to the public the dangers that arise when powerful management and powerful labor are stalemated. Congress will eventually feel obliged to enact remedial legislation that will help.

We do not minimize the burdens of doing business during the competitive sixties.

Those burdens are many and complex. They can be alleviated only by people—management and labor working together, as a team.

We have every confidence that metalworking management will do its part.

It has never failed to meet a challenge!

President's Budget Hints at Possible Depreciation Help

A HINT of possible loosening on depreciation is found among the 79 legislative proposals in President Eisenhower's budget for fiscal 1961.

He asks that any gains from the sale of depreciable property be treated as ordinary income, rather than capital gains. "Thus the advantage gained in claiming excessive depreciation deductions would be materially reduced, and the taxpayer's judgment as to the useful life of his property could more readily be accepted," commented the President.

High Treasury sources think that would be a first step toward depreciation reform. They believe the capital gains route has been abused. Because "many people are doing better than Bulletin F (particularly large taxpayers), there is no disposition to revise Bulletin F at this time," says one source.

Treasury officials say there would be no loss of revenue if the President's recommendations were followed in conjunction with easier rules on depreciation. The department is especially concerned about such industries as electronics where equipment becomes obsolete rapidly.

Other Budget Briefs . . .

Some 18,000 trucks will be ordered for the Army under the new budget—a one-third increase over fiscal 1960 . . . About 50 per cent of the Pentagon's construction budget goes into missile bases . . . Bureau of Mines will divide its $5.3 million for nonferrous metals research like this: $1.9 million for base metals like copper and zinc; $1.4 million for light metals, titanium, aluminum, and magnesium; $2 million for beryllium, columbium, tantalum, and rare earths . . . Federal spending for research and development totals $8.4 billion, up 20 per cent over fiscal 1960.

Key Figures for Metalworking in '61 Budget

(Millions of dollars)

1. Defense Department

	1961	1960	1959
Procurement, research, development, test, evaluation	17,519	17,623	17,268
Aircraft	6,477	7,132	8,081
Missiles	4,953	4,832	4,323
Ships	1,783	1,790	1,626
Other items[1]	3,428	3,183	2,676
Military sciences[2]	509	429	335
Management & support	218	220	227
Emergency fund	150	37	0

2. National Aeronautics & Space Administration Appropriations[3]

Const. & equipment	89	85	48
Research & development	543	332	205
Sounding rockets	8	9	4
Scientific satellites	42	24	21
Lunar & planetary exploration	43	49	32
Satellite applications	26	11	5
Manned space flight (Mercury)	108	87	46
Space propulsion	61	45	20
Delta rocket	13	13	13
Centaur program	47	37	4
Saturn big booster (Recently transferred from Army)	81	..	..

3. Bureau of Mines Request for Research Funds

	1961	1960	1959
Bituminous coal	6.3	6.2	6.3
Anthracite	0.9	0.9	1.1
Petroleum, natural gas, oil shale	2.7	2.7	2.6
Ferrous metals	3.7	3.7	3.6
Nonferrous metals	5.3	5.3	5.2
Nonmetallic minerals	2.1	2.1	2.1
Foreign mineral activities	0.3	0.3	0.3

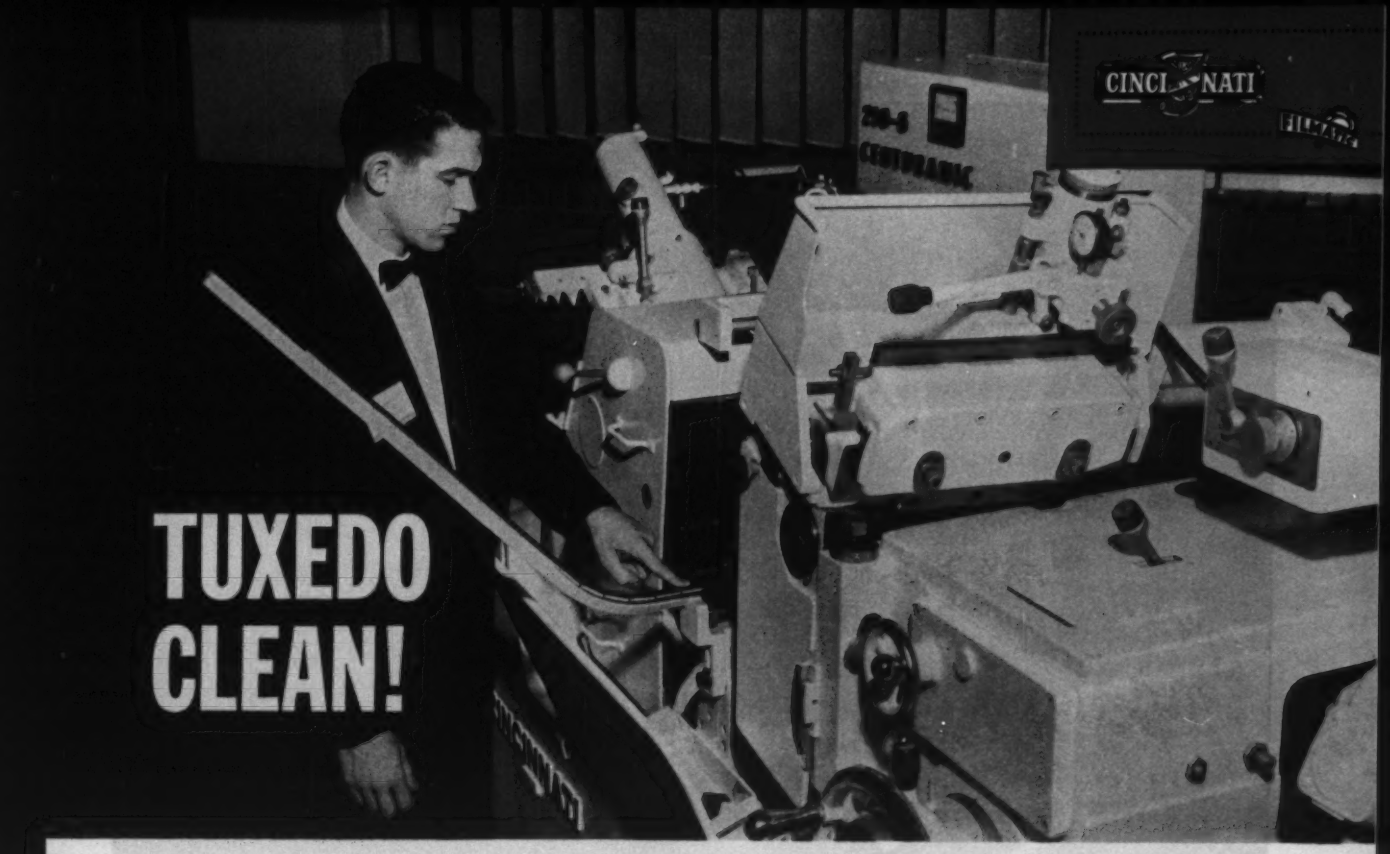
4. Atomic Energy Commission Programs

Raw materials (uranium & concentrates)	630	734	706
Special nuclear materials	568	563	541
Weapons	495	492	485
Civilian power reactor development	178	166	129
Merchant ship propulsion	8	7	5
Army power reactor	15	12	9
Naval ship propulsion	85	87	83
Aircraft propulsion	73	63	67
Missile propulsion	40	35	22
Satellite power sources	14	12	8
Civilian isotope development	5	4	3
Peaceful nuclear explosives development	8	8	3

1. The Army will spend $650 million from its procurement account on trucks, tanks, and other weapons, plus communications and logistics support. The Navy will spend $654 million on ship support, weapons, and antisub warfare. The Air Force will spend $1.1 billion on rockets, vehicles, communications, and electrical equipment; balance on research including Advance Research Projects Agency.

2. Basic research materials development, rocket fuels, astronomy, oceanography, electronic research, others.

3. Appropriation request from Congress is better guide to NASA plans than spending anticipated because its efforts are subject to sharp fluctuations within fiscal year. Only those appropriations are given which directly affect metalworking.

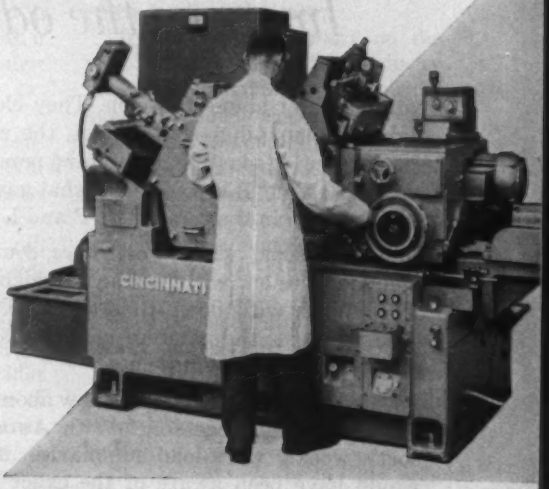


New *Centuramic* Centerless Grinders . . .

are clean, quick, convenient to set up and operate

The demonstrator wore a *tuxedo!* It was an unusual event, of course, part of Cincinnati's recent 75th Anniversary program. He was wearing the tuxedo primarily to show how clean the new Centuramic Centerless Grinders are to operate. These new machines result from Cincinnati's 38 years of experience in building fine centerless grinding machines and related equipment for precision grinding every conceivable type of work. Some parts are so small they flow out with the grinding fluid, others are heavy 30-foot long steel bars, or bowling balls, surgical sutures, glass bottle stoppers, fishing rods, and bearing races up to 36″ in diameter. Cincinnati brought the advantages of centerless grinding to every type of industry.

The new line of five CINCINNATI Centuramic Centerless Grinders produce higher quality, lower cost work than ever before. They are cleaner and more convenient to operate; quicker to set up. The 210-6 size illustrated above is the versatile "Handy Andy" member of the line. Complete information is in catalogs G-727-D and G-728. Write today for your copies. **Grinding Machine Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.**



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PRECISION GRINDING MACHINES: CENTERTYPE • CENTERLESS • MICRO-CENTRIC • ROLL • CHUCKING • CENTERLESS LAPPING

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Imagine the odds management is bucking!

No, you can't blame the men. They clocked in at eight this morning – but, as yet, the work hasn't reached their department. Pitching pennies at least passes the time. But you can bet that game of theirs will show up in the company's P and L!

Sometime soon, when work *does* come through, their department will need an extra shift to get it done. What with down-time one week and overtime the next, the game of chance management's playing is hardly penny-ante.

Too bad this company didn't know about Automatic Keysort Data Processing! With Automatic Keysort's weekly work-load summaries, management would have been aware of the exact situation in every department in the plant. Knowing *on time* which were due to be light, and which overloaded, they could have acted *fast* to arrange schedules, transfers, extra shifts. Being informed of things almost as they happened, they could have kept production moving smoothly—and profitably.

Automatic Keysort's easy-to-use machines and punched cards require no specialized personnel, no restrictive procedures. Designed to fit your business as it stands and as it grows, Keysort will give you all the fast, accurate information you need for modern management control of every operation. And at remarkably low cost.

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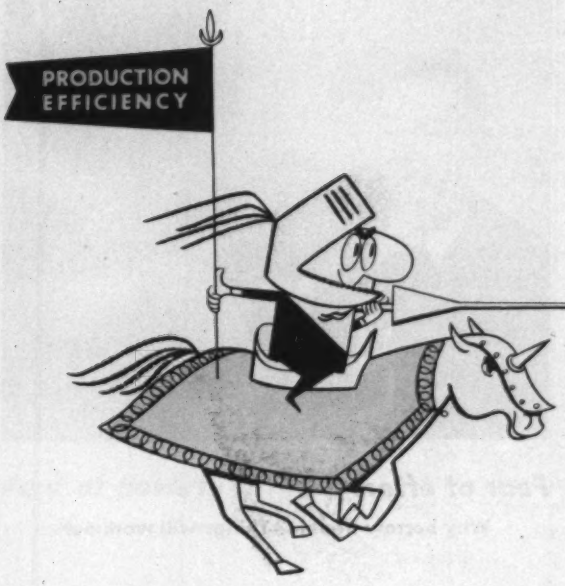
NEW CONCEPTS IN PRACTICAL OFFICE AUTOMATION



The $20 Billion Challenge

AMERICA'S largest industry, metalworking, is more than $20 billion short of optimum production efficiency.

If we could overcome that deficit, we could spur productivity to offset rising employment costs, halt inflation, and recoup our foreign trade losses.

A STEEL survey of the managers who buy one-third of metalworking equipment indicates that metalworkers would spend $20.7 billion this year on machinery to win maximum productivity if they had unlimited funds. Of course, we can't afford an outlay of that magnitude in one year, but the industry will make estimated expenditures of $5.65 billion in 1960, which is itself a record.

Yet we'll still be $15 billion short of the optimum by the end of the year. Metalworking replaces its inventory of equipment only once every 28 to 30 years. Its value: $57 billion on the basis of original cost, at least 50 per cent more on the basis of replacement cost. The production equipment in about half of our plants was bought during or immediately after World War II, meaning it is 15 years old or older.

While the $5.65 billion in spending planned for 1960 looks and is promising, only $3.15 billion of it will replace worn-out or obsolete equipment; $2.5 billion is for expansion.

We can thank the great expansions during and since World War II for making our equipment stocks as modern as they are. But now the rate of growth is leveling off.

"We need a more systematic approach to re-equipment to keep our existing stocks of machines up to date," says C. A. Woodley, executive vice president of Caterpillar Tractor Co., Peoria, Ill. It's one of only 90 companies cited to STEEL by the machine tool industry as having outstanding re-equipment programs.

Here's why only 90 were named:

"Frankly, the situation is a sorry one. Any major machine tool manufacturer should be in a position to name many customers who have done or are doing a good equipment modernization job. It just can't be done. American industry in recent years has not thought in terms of across-the-board modernization."—lathemaker.

"It is a sad commentary on the state of U. S. productive industry that we are unable to give you the name of a single customer who has done an outstanding job of modernizing capital equipment."—grinding machine manufacturer.

"I have given a great deal of thought to your question. It is surprising to me to realize that so few plants have really undertaken a thorough modernization job."—West Coast machine tool distributor.

"We feel we cannot give you an example which in our minds will satisfy your requirements."—press builder.

"Too many plants in this area have no planned replacement program and—in spite of the best efforts of our salesmen—are content to operate obsolete equipment."—East Coast distributor.

The 90 nominees have undertaken the trouble and expense of a

Six Basic Fears that Block Planned Equipment Buying

Fear of taking a chance

I can't lose cash. Will my straight stand up?

Fear of effort

Why borrow trouble? Things will work out

Fear of the future

If it won't pay off in 90 days, the deal's off

Fear of the union

I can't buy. The union would cause trouble

full-scale modernization program for two basic reasons:

1. To pare costs.
2. To improve quality.

Are we to believe, then, that the almost overwhelming majority of equipment users in metalworking don't want those results?

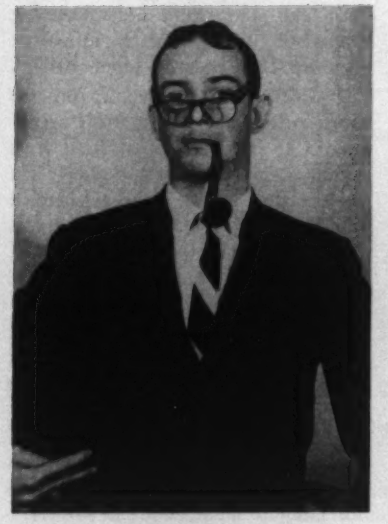
Fear Steps In

No, says Dr. F. Robert Shoaf, motivation research consultant and assistant professor of marketing at New York University. He is doing depth interviews for STEEL to learn why and how equipment is or is not bought. He finds that most metalworking managers want (almost desperately) to cut expenses and boost quality. They generally recognize that better purchase and use of equipment are two of the few remaining ways to put a keener edge on costs and quality.

Yet they often can't get started with a job they know needs doing because of emotional blocks. Listen to Dr. Shoaf:

Fear of poverty

Here's me if we bought now



Fear of change

The old way is always best

"Some 75 per cent of equipment purchases by industry are on an emotional basis. Its methods are expedient. For example, industry usually buys for the quick payoff. That leads to short range vision and tends to rule out long range planning. I could find few companies which would consider equipment that wouldn't pay off in five years or less. But perhaps the machine that takes ten years to pay off offers intangibles like improved quality, greater capacity, faster deliveries, greater versatility, or processing shortcuts. That machine could be as good a buy as one with a three year payoff, but it's not bought because industry is boxed in emotionally about getting a fast return on its investment."

Six major fears must be overcome before we can meet the $20 billion challenge (see illustrations and captions at left). How to do the job?

Psychologists agree that three moves can help counteract fear:

1. Expose the fear.
2. Counterattack with another irritant.
3. Break down the problem into its smallest components.

You can expose the fears easily. And you can counterattack just as readily. Many alarming results can obtain if a company is afraid to re-equip.

● Example: The steel industry has to re-equip to offset at least part of the added cost of its new contract. It is already taking steps to do that. It will spend 31 per cent more to modernize in the first half of 1960 than it did in the last six months of 1959. The alternative: Red ink on its balance sheets, plus increasing competition from abroad. Foreign steel bars can be shipped up the St. Lawrence Seaway to Cleveland and sold to a customer in that city for $118 per ton, $55 below the price that a mill in Cleveland must get for the same product.

Foreign steelmakers are modernizing. New machines at Mannesmann steel plants in Germany are normally written off in 11 years. One of the most modern pipe mills in the world is the highly automated facility of Mannesmann-Hoesch at Mundelheim.

"Most foreign fastener makers have production equipment that is as efficient, or more so, than the equipment in U. S. plants," says William E. Ward, president and general manager of Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y. "They got most of it through Uncle Sam's generosity after World War II. And the foreign producers' wage rates are only one-fourth to one-third of ours. So they can undersell us in the domestic market by as much as 30 per cent."

● Example: Harley-Davidson Motor Co., Milwaukee, was almost driven out of the motorcycle field by 1951 because of foreign competition. But it's going strong now with cycles and scooters. "We know it was a case of rolling up our sleeves or going out of production," recalls William Davidson, president. "We're hitting the problem from every angle now, including modernizing our production facilities."

● Example: A pump manufacturer landed a contract to make automotive power steering pumps. Deciding not to gamble too much, management adapted its present machinery to turn out the new product. When the contract folded, the equipment couldn't be readapted for other designs, and the company had to drop out of that market.

● Example: A maker of valves for automobiles was threatened with the loss of a large contract if he didn't meet delivery schedules better and reduce rejects. A special automated setup did the job. While the new equipment was far more expensive than the old, it saved the contract and eventually brought about lower costs.

The Parts of the Problem

One of the most effective—and difficult—ways to counteract fear is to break it down into its smallest components. The problem is where to begin in dealing with the improved purchase and use of equipment (and also with the improved purchase and use of materials which STEEL will discuss in the second half of 1960). Machinery costs many thousands, perhaps millions of dollars.

Metalworking managers shudder at the possibility of errors in equipment buying and know that many have been made. One of the few that a company had the courage to publicize: A. O. Smith Corp. conceived an automated dream plant to turn out auto frames. The Granite City, Ill., facility worked—but only after three years of agonizing delays caused largely by labor slowdowns. Overlooked: The labor factor in the equipment program.

In another case, an auto com-

pany has yet to get one of its engine assembly plants to do the job originally intended. One of the major causes of the problem: Inadequate communications between engine designers, production planners, and equipment builders.

An aircraft supplier spent $1 million on one machine that never went into production because the contract was canceled before it could start operating.

The lesson is clear: Equipment buying calls for mature generalship, and that's a big reason why not enough of it is done. In succeeding articles, STEEL will analyze the important aspects of equipment buying to achieve production efficiency. The job is complex but can be made manageable by breaking it into these parts:

Finding the Need

The key to meeting the $20 billion challenge is a master plan for modernization and expansion—one to be followed in good times and bad. Central to the plan is a sound method of forecasting the need for new equipment, whether it results from expansion, new manufacturing methods, or new products. Also required: Research on new technological development that will affect equipment planning, research on sales potentials (for years ahead) that will influence the kind of equipment needed.

Organizing for Efficiency

STEEL will examine the role to be played by each member of the management team in the purchase of new equipment. Without a clear chain of command and open communications, you stand little chance of keeping abreast of shifting markets and new production techniques. In organizing for efficiency, you need to find answers to questions like these: How can I use the talents of market research, design, and engineering staffs in equipment buying? How should suggestions for equipment purchases be initiated? Who should head up the production efficiency program?

Selling to the Boss

Some of metalworking's failure to keep modern arises from a lack of communications. The top boss may be sympathetic to proposals to improve production efficiency, but they may never get to him because they are slapped down when they run a gantlet of middle managers. How do you sell the middle bosses? What's the right climate for ideas? How do you keep communications channels open?

Finding the Money

"I can't get a single new piece of machinery in here unless the man upstairs has the money for it in a sack," laments a plant manager. You'll be better prepared to sell your ideas and more enlightened as to timing if you understand the methods of financing new equipment. What part do earnings play? What kinds of credit can you get?

Reforming Depreciation

One way to get the money for more equipment spending is through depreciation reform. The U. S. tax setup is the most archaic among modern industrial nations. Industry is at least partly responsible for the state of our legislation. But you can do a better job with tax depreciation even under present laws. More rapid equipment turnover by industry would go far in persuading Congress that reform is needed. The outlook for action in Washington is the best in years—if industry tells its story.

Reducing Capital Outlays

Try leasing, rebuilding, or used equipment if you can't afford to buy new machines. In some cases, such as short term production contracts, any of the three are probably better than new purchases even if ample money is available.

Engineering for Efficiency

Caterpillar Tractor's Mr. Woodley believes American equipment builders design too many gadgets into their machinery. The criticism points up the need for closer liaison between builder and user. Who should pay for equipment engineering, especially when special, one shot machines are involved? How much engineering should the user do himself?

Picking the Vender

Time and again, users admit to STEEL interviewers that they picked one builder over another simply because they like him better. "I'm not enough of an engineer to know which machine was the best. Prices were about the same, so I picked the better known manufacturer," another buyer revealed. Needed is a little more science in rating the various factors to be considered in buying equipment.

Selling Labor on Efficiency

A new machine is only as good as the men who will operate it. Needed is a better selling job on the workers. Needed is a program to bring at least the foremen into the selection of new equipment. The best laid engineering and marketing plans of A. O. Smith failed at Granite City because labor balked.

Industry had to give up on the work rules issue in the steel settlement. It proves how difficult it is to cut costs and improve quality via that route. It can be done, but a more fruitful approach is through the better purchase and use of equipment.

To get the optimum production efficiency in metalworking, we'll have to spend an estimated $20 billion. That's a lot of money, but the return will be far greater in better profitability, lower prices, less foreign competition, and better jobs for labor.

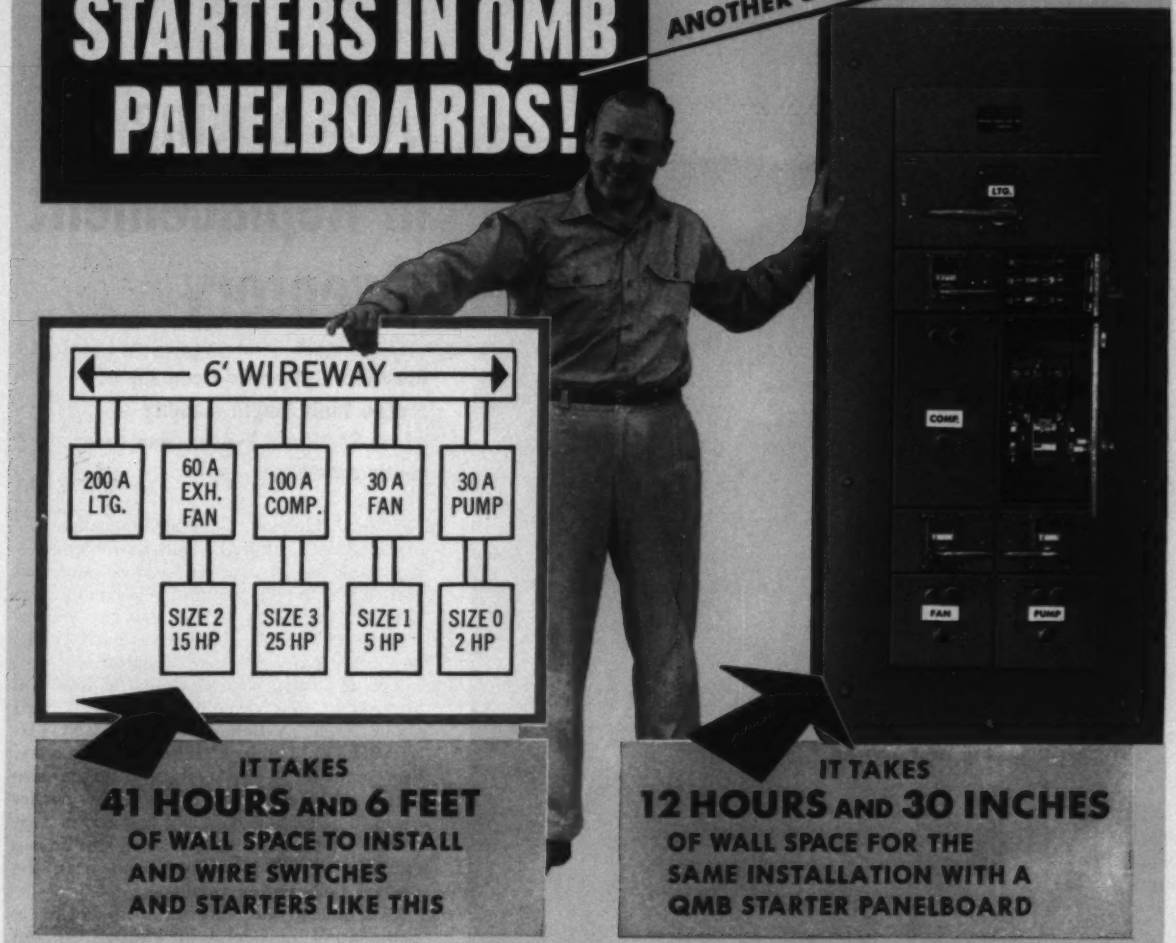
Production Efficiency

How to Find the Need for It

On Feb. 8, STEEL will discuss that subject on these pages in the third article on Production Efficiency. For a free copy of each article in this Program for Management series (the first appeared Jan. 11, Page 45), write: Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

STARTERS IN QMB PANELBOARDS!

ANOTHER SQUARE D FIRST!



IT TAKES
41 HOURS AND 6 FEET
OF WALL SPACE TO INSTALL AND WIRE SWITCHES AND STARTERS LIKE THIS

IT TAKES
12 HOURS AND 30 INCHES
OF WALL SPACE FOR THE SAME INSTALLATION WITH A QMB STARTER PANELBOARD

QMB MEANS LESS TIME AND LESS SPACE PLUS

- **LOWER COST** • Time is money. The overall cost of QMB motor starters is usually less than that of separately installed starters and switches.
- **PLUG-IN FLEXIBILITY** • Plug-in switches and starters can be removed and installed in minutes. Minor circuit changes can be made without costly down time. Components easily rearranged if processes change.
- **ADDED SAFETY** • Interlocking prohibits opening starter or switch doors when switch is "ON."

QMB panelboards accommodate reversing and non-reversing starters, sizes 0 through 4. QMB switchboards and unit substations handle sizes 0 through 5. Part winding and two-speed starters available on order. All components available factory-assembled and wired. Enclosures, starters and plug-in switch units are also stocked by your Square D distributor for on-the-job assembly.

Notice how the PLUG-IN switch unit is mounted directly above the starter, permitting interlocking. The starter cannot be opened when the switch is in the "ON" position.

It's easy to order these starter and switch units. See your latest Square D Digest for further information.

SQUARE D COMPANY

wherever electricity is distributed and controlled

from the Power Unlimited complete belt line

90% Saving in Replacement Inventory

Ranchers Cotton Oil Company of Fresno finds length-stability of "U.S." Royal V-Belts also saves costly downtime.

Mr. E. D. Hudson, General Superintendent of Ranchers Cotton Oil, had a problem. Almost 1000 V-belts were in constant operation and, when a belt required replacement, as many as 15 had to be tested to find a compatible set of four. This caused partial shutdown and required large inventories.

Mr. Hudson, who believes in keeping abreast of new developments, had read about "U. S." V-Belts and their LENGTH-STABILITY! He decided to give them a try. Sure enough, every belt of a given size matched perfectly! Mr. Hudson now carries but 50 belts in stock and he knows that should he run short of any given size he can call his "U. S." Distributor and have the needed belts within minutes.

"We placed the entire problem in the capable lap of the George M. Philpott Co., our 'U.S.' Distributor. We merely specified machinery, h. p. and speeds. The distributors, in cooperation with 'U. S.' engineers, designed the actual drives according to their experienced judgment."

Savings in time and inventory were important. In addition, the system worked so well that in 6 months, operating 24 hours a day, there has not been a single failure in any of the hundreds of "U. S." V-Belts involved.

. . .

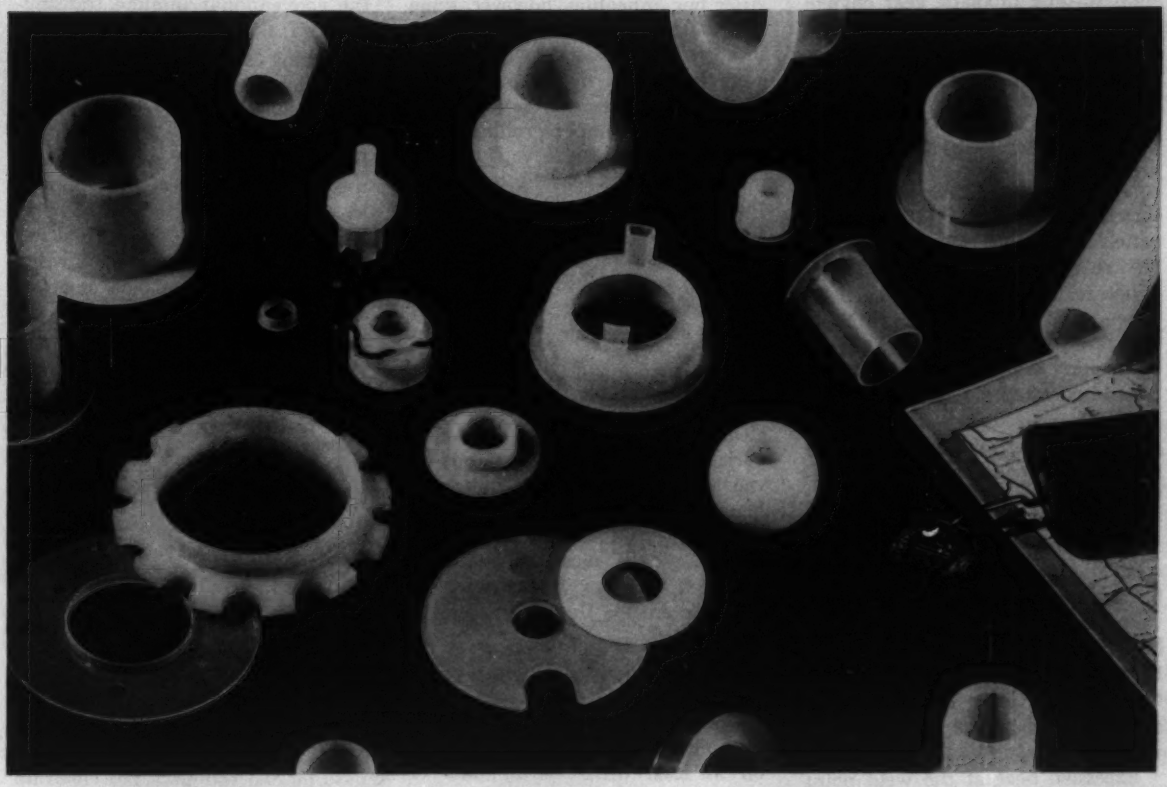
To Mr. Hudson and George M. Philpott Company go the honors for a wise choice that has meant untold savings. You can enjoy such savings by calling your "U. S." Distributor. He has the belts and the knowledge to save you thousands of dollars.

Mechanical Goods Division

United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Company, Ltd.



Plastics Drive for More Auto Uses

PLASTICS are beginning to muscle in on aluminum's reputation for being the big promoter in automotive circles. Suppliers of plastic materials and parts expect to see at least two more application breakthroughs on 1961 and 1962 models.

Instrument cluster housings molded from acetal resins are a good possibility by 1962, say two plastics fabricators represented at the Society for Automotive Engineers meeting, Detroit.

E. I. du Pont de Nemours & Co., Wilmington, Del., says acetal resin requires virtually no finishing operations, can be injection molded in color, and weighs only one-fourth as much as zinc housings.

Nylon fuel lines to replace steel tubing are a second likelihood. Automakers will use some 18,000 miles of steel tubing for fuel lines this year. Although nylon tubing still costs twice as much as the 3/8 in. steel material, it can be easily shipped in coils and can be installed without special tools.

Precedent for changing to another material already has been set. Pontiac is using aluminum instead of steel fuel lines this year. Plastics people say another major boost in the price of steel will make nylon tubing directly competitive.

• **Bigger Loads** — Bearings made from the newer fluocarbon and acetal resins will gain more attention from automotive designers who continue working toward the car that needs no monthly lubrication. The plastics people admit that their products expand under heat ten times more than metal does. Heat conductivity is poorer than with most bearing materials. Load strengths usually are more limited. But they also claim that properly designed parts that are subjected to temperature and load extremes can successfully use plastic materials, particularly if they're filled with glass fibers or metallic fiber materials.

Injection molded, filled nylon, piston rings are in use in the farm equipment field. Acetal resin seals are being specified for power steering units in automobiles. European carbuilders have been using a bearing material composed of a steel backing strip, a middle layer of porous bronze filled with a mixture of resins and lead powder, and an overlay of the same material. That provides good heat conductivity, high strength, and low frictional characteristics.

Bearing material of that type is in production use in European cars for propulsion shaft steadying bush-

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ings, brake and clutch pedal assemblies, throttle linkages, gear change mechanisms, gearbox cross shafts, pendant pedals, and gear lever linkages.

Automakers Fight Corrosion

Unitized bodies have highlighted corrosion problems. Sills, rocker panels, and side rail supports are key rust areas because their box structures make ideal traps for water and condensation. Road salts are the biggest detriment to eliminating body corrosion, says an American Motors Corp. report to the SAE.

Several types of body dips and priming systems have been developed to protect vulnerable underbody areas from rust. Chrysler and AMC are strong promoters of this method of rustproofing. Ford and General Motors are inclined to think that galvanized steel may prove a better solution. Behind the scenes talks at the SAE meeting reveal that Ford, at least, has solved one of galvanized steel's biggest problems—welding.

Excessive heat at the weld point was making zinc strip off and alloy itself with the copper of the welding electrodes. The brass alloy prohibited full current flow through the electrode. Result: Instead of spotwelds, fabricators were getting more of a soldering effect. Electrode tips had to be resurfaced every 500 welds or less, making for low production and high costs.

By switching to a zirconium-copper alloy electrode, Ford is able to get up to 1800 welds before redressing tips. Further experimentation with synthetic coolants instead of water for cooling the weld point temperatures also helps in extending production runs. Ford is seeking a universal electrode that it can use for all welding operations. The zirconium-copper alloy is too expensive to use on noncoated steel.

● **GM Testing**—In further tests to determine corrosion causes, General Motors researchers have been investigating what kinds of surface conditions or impurities on steel may speed the rusting process. Discussing this research before SAE members, Gene Leithauser of GM's research staff, reports: "Tests show that corrosion resistance of steels was excellent before box annealing. After box annealing, however, some of the same steels became weaker in corrosion resistance while others were unaffected by box annealing. In all cases, corrosion resistance of steels after temper rolling was virtually unchanged.

"These results lead us to suspect there may be some contaminant on the steel that can be removed easily by the normal cleaning methods used in phosphating as steel is processed before box annealing. If these contaminants are present when the steel is annealed, they may become so imbedded they can't be removed by conventional cleaning methods. Temperature variations in different locations in the annealing furnace might be a factor. Another suspect is the location of the coil when it is box annealed. Steels most susceptive to corrosion show a high degree of lead content on the surface."

Transaxles Make Progress

Combination axles and transmissions (transaxles) will be used on at least three more makes of cars in 1961 and 1962. Corridor talk with SAE members indicates that Pontiac will have a transaxle in its small car, although Buick and Oldsmobile reportedly will use the conventional slimline transmission on their first small job.

Tooling is out for a combination unit for regular Cadillacs and Oldsmobiles, but this transaxle won't go into production use until 1962. Ford is developing a transaxle to use with a front wheel drive. Chrysler seems less enthusiastic. It's working with a multisection driveshaft with as many as six universal joints to link transmission and rear axle.

Reduced costs, increased efficiency, weight distribution, and elimination of the floor tunnel are among the reasons for adopting transaxles.

A major problem has been to develop a single fluid that will permit the right amount of frictional play at the right time for the transmission components, yet prevent scoring and excessive wear of hypoid axle gears. A single fluid would permit elimination of costly rotating shaft seals between axles and transmissions. Also, design and service problems would be simplified.

So far, no company has come up with a lubricant that's satisfactory enough to be written into standard specifications. That's given as one of the reasons Cadillac and Olds are postponing their use of the transaxle. Neither division wants to risk its reputation for quality. Discussing the development of such fluids at the SAE meeting, Chevrolet engineers point out that while they have a satisfactory fluid for the Corvair, it is not adequate.

● **Search Continues**—GM's research labs have tested over 52 lubricants. They've confirmed that hypoid axle gears should be phosphated for best results, but the coating must be extremely fine grain or the fluids that work well for the transmission will cause some of the coating to flake off. That causes excessive wear on gear faces; the debris spells trouble for transmission operations.

Technical Center engineers tell the SAE that they now have five fluids (three mineral base, one synthetic base, and one additive base) that are worth further development. It looks like another year of testing must be conducted before a fluid can be specified for general transaxle use.

U. S. Auto Output

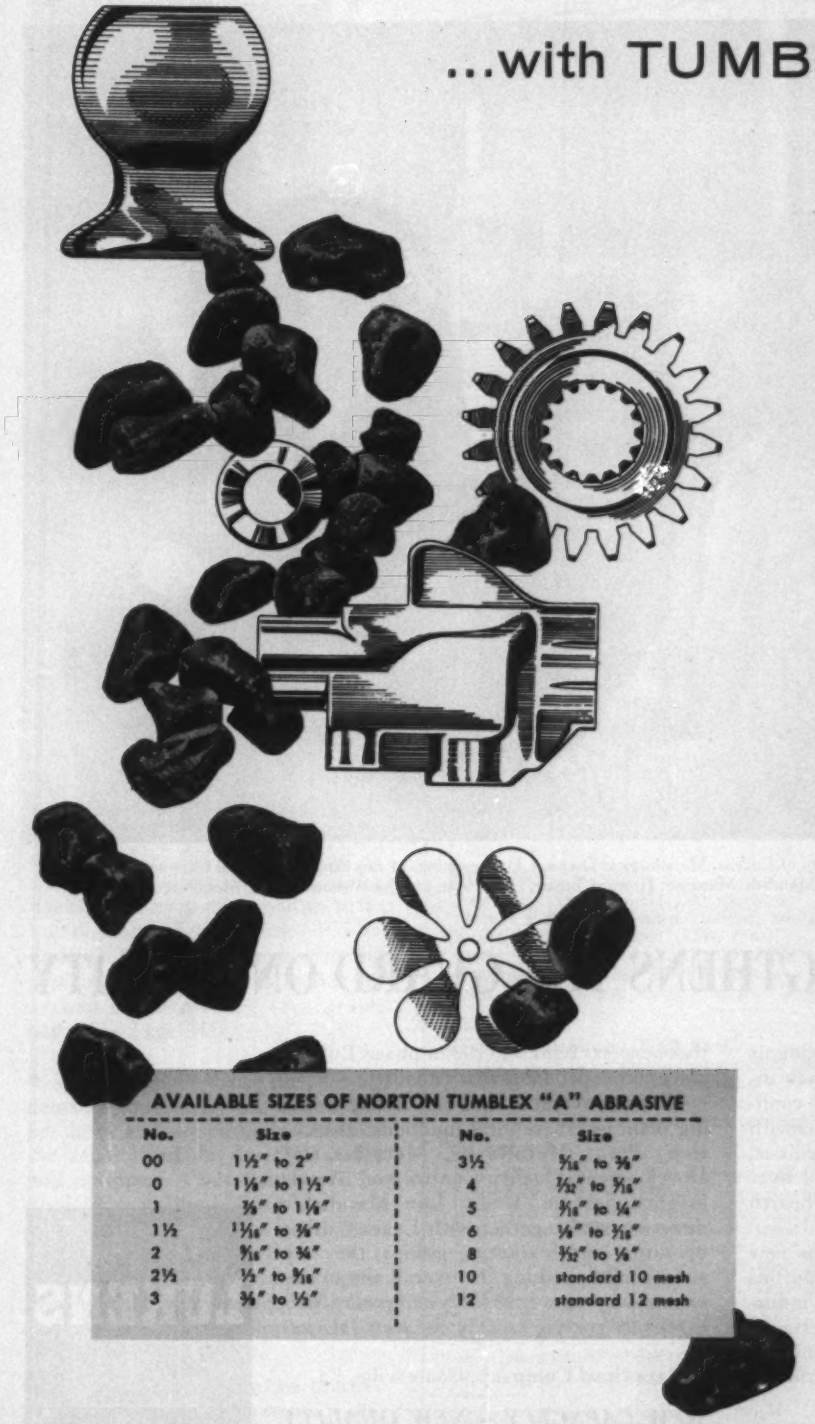
	Passenger Only 1959	1958
January	545,757	489,515
February	478,484	392,132
March	576,085	357,048
April	578,825	316,594
May	546,817	349,613
June	557,994	337,446
July	555,418	321,017
August	239,152	180,447
September	258,157	130,460
October	507,530	261,701
November	254,518	514,152
December	494,931	593,920
Totals	5,593,668	4,244,045

Week Ended	1959	1958
Dec. 19	152,449	135,964
Dec. 26	103,219	104,907
	1960	**1959**
Jan. 2	112,113	97,664
Jan. 9	163,249	133,362
Jan. 16	176,245†	135,953
Jan. 23	175,000*	126,843

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

Finish parts fast ... economically ... by the barrelful!

...with TUMBLEX* "A"



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Available in a range of fourteen sizes, Norton TUMBLEX "A" abrasive is capable of providing excellent cut and finish on a *wide* variety of work pieces. It will not glaze, but instead will maintain a continuous high rate of cut.

Let our Sample Processing Department show you a better way of finishing. Send us unfinished samples and one finished piece. We will barrel finish samples with TUMBLEX "A" abrasive — or with one of the other Norton TUMBLEX abrasives if more suitable. Our return report will tell you exactly how you can improve product quality while cutting finishing time and costs. NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

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AVAILABLE SIZES OF NORTON TUMBLEX "A" ABRASIVE

No.	Size	No.	Size
00	1½" to 2"	3½	5/16" to 3/8"
0	1⅛" to 1½"	4	1/32" to 5/16"
1	⅜" to 1⅛"	5	1/16" to ¼"
1½	11/16" to ⅜"	6	⅛" to 3/16"
2	5/16" to ¾"	8	1/32" to ⅛"
2½	½" to 5/16"	10	standard 10 mesh
3	⅜" to ½"	12	standard 12 mesh

NORTON ABRASIVES

G-378

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Now the nation's third largest steel plate producer.

Protecting product quality is the responsibility of Lukens' Metallurgical Division. Four members of this expanded control team are, left to right: Sam Lemmon, Metallurgical Service; Lou Mandich, Manager; Howard Turner, Inspection; and Joe Althouse, Chief Metallurgical Engineer.

LUKENS STRENGTHENS THE GUARD ON QUALITY

To the steel buyer, Lukens' new ranking as a steel plate producer means more than increased tonnage. It promises complete confidence in buying decisions. For, together with the expansion of its steel making facilities, Lukens has strengthened its control over plate quality at every step—from open hearth to customer's shop.

The men assembled above in Lukens' new Physical Testing Laboratory spearhead this increased control. Working with the industry's broadest range of plate materials—from ordinary carbon steel to ultrasonically tested hullplate for nuclear submarines—these experts represent the emphasis Lukens places on dependable plate quality.

Now consolidated into one closely working team are these vital functions: Inspection, Plant Metallurgy, Metallurgical Development, Quality Control and Metallurgical Service. Under Lou Mandich's direction, and together with Lukens' other operating and marketing groups, they are successfully pursuing the overall aim of our expansion program: *capacity and quality levels to meet the growing needs of our plate fabricating customers.*

Lukens Steel Company, Coatesville, Pa.

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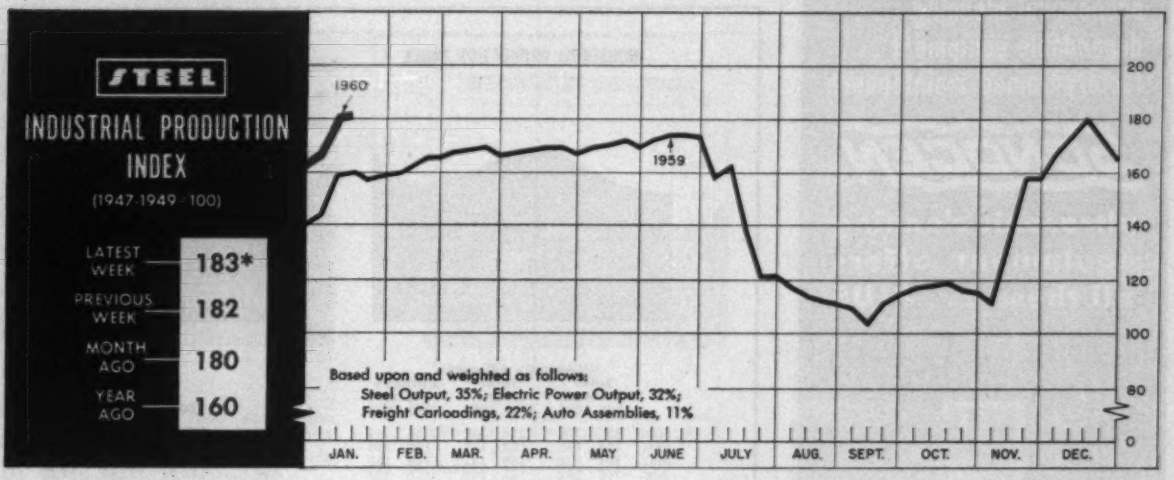
SERVING INDUSTRY WITH A WIDE RANGE OF SPECIALTY CARBON, ALLOY, ARMOR AND CLAD STEEL PLATE • HEADS • PLATE SHAPES • PLATE-MATE WELDING ELECTRODES AND WIRE



*Week ended Jan. 16.

Production Index to Peak by June

THE FIRST HALF will be a record breaking period. Production, especially, will be rising monthly to new highs until the peak is finally set in May or June.

With the publication of the Federal Reserve Board's revised industrial production index, businessmen suddenly found that they had done better than they thought since World War II. And they found that the prestrike peak was a seasonally adjusted 166 (1947-49=100) set last May and June instead of 155 in June alone. Now the index has climbed back up to within striking distance of that peak—165 in December—and will shoot over the previous high mark this month by a comfortable margin. (See graph and table, Page 54.)

• **Model of 1960**—Once the pent-up demand imposed by the steel strike has been at least partially satisfied, the rapid climb in the FRB index will disappear. But that won't be until May or June. From then on, the trend line will be as flat as the palm of your hand. If you want a model for the year, try this one: First quarter will average 168; second quarter, 174; third quarter, 172; and fourth quarter, 173.

If you want to be more precise, here is the way the seasonally adjusted FRB index could shape up in the year ahead:

January	167	July	173
February	168	August	172
March	170	September	172
April	172	October	173
May	175	November	173
June	175	December	174

• **Here's Why**—That makes an average of 172 for the year, which is about 8 per cent higher than the strike depressed average of 159 in 1959. But the validity of that projection will come in for some pretty severe testing throughout the year. Starting in the first quarter, it rests on the assumption that there will be a great deal of catching up from the steel strike. Both steel produc-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1,000 net tons)[2]	2,721[1]	2,727	2,056
Electric Power Distributed (million kw-hr)	14,100[1]	14,308	13,324
Bituminous Coal Output (1,000 tons)	9,010[1]	7,325	8,195
Crude Oil Production (daily avg—1,000 bbl)	7,100[1]	7,112	7,087
Construction Volume (*ENR*—millions)	$415.6	$231.4	$301.6
Auto, Truck Output, U. S., Canada (*Ward's*)	216,874[1]	200,950	166,693
TRADE			
Freight Carloadings (1,000 Cars)	600[1]	592	586
Intercity Truck Tonnage (changes from year ago)	+8.6	+7.5	...
Business Failures (Dun & Bradstreet)	242	321	...
Currency in Circulation (millions)[3]	$32,282	$32,519	$31,710
Dept. Store Sales (changes from year ago)[3]	+9%	+7%	+4%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$25,513	$25,971	$24,918
Federal Gross Debt (billions)	$292.4	$290.7	$282.7
Bond Volume, NYSE (millions)	$27.7	$32.8	$38.4
Stocks Sales, NYSE (thousands of shares)	17,681	18,027	21,015
Loans and Investments (billions)[4]	$103.9	$105.7	$103.1
U. S. Govt. Obligations Held (billions)[4]	$27.0	$27.5	$34.1
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[6]	233.7	233.6	217.5
All Commodities[7]	119.1	118.9	119.4
Commodities Other than Farm & Foods[7]	128.6	128.6	127.3

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1960, 2,849,474; 1959, 2,831,486. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

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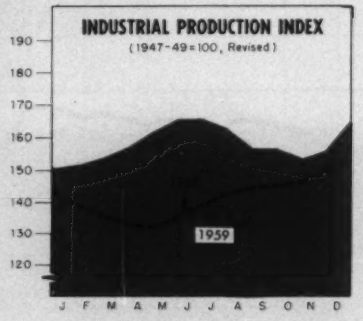
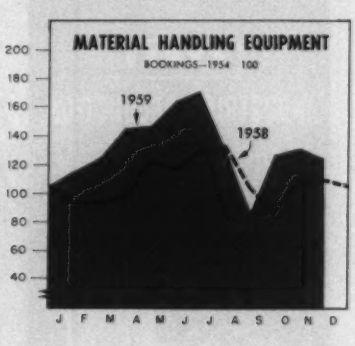
THE BUSINESS TREND





	(Seasonally adjusted) Total Production 1959	1958	Total Mfg. 1959	1958	Durables Mfg. 1959	1958
Jan.	152	139	150	137	156	141
Feb.	154	136	153	133	160	135
Mar.	157	133	156	131	165	133
Apr.	162	132	161	130	170	129
May	166	135	165	133	177	133
June	166	139	166	137	178	138
July	163	142	163	140	171	141
Aug.	157	144	156	142	158	144
Sept.	157	145	156	143	157	144
Oct.	154	146	153	144	155	145
Nov.	156	150	154	148	156	154
Dec.	165	151	164	149	174	155
Avg	159	141	158	139	166	141

Federal Reserve Board. *Revised.
Charts copyright, 1960, STEEL.

	1959	1958	1957	1956
Jan.	115.84	93.07	128.34	122.43
Feb.	124.77	93.49	139.29	129.56
Mar.	146.36	97.89	140.76	166.14
Apr.	147.28	122.36	132.67	145.20
May	164.45	118.04	157.95	155.53
June	170.72	131.15	121.57	159.13
July	130.26	134.34	128.31	165.50
Aug.	87.02	104.46	110.09	168.70
Sept.	126.43	85.41	116.79	130.35
Oct.	131.09	111.35	124.80	143.38
Nov.	124.16	110.88	87.80	138.50
Dec.	.....	105.97	105.65	117.76
Avg	.....	109.87	124.34	147.68

Material Handling Institute Inc.

tion, now averaging about 95.5 per cent of capacity, and auto production, racing at a record pace, should take care of the 5 point increase by March.

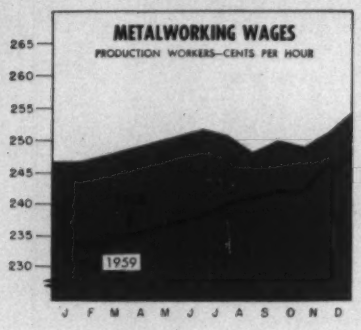
During the second quarter, manufacturers should nearly recoup their inventory losses. But demand for durables will still be high, requiring them to maintain steady buying of raw materials. By April, iron ore stockpiles will be at the lowest level in years, forcing an early start of the Great Lakes shipping season, weather permitting. Both ore and coal production will increase and result in an unseasonal rise in railroad freight carloadings. The full impact of restocking will be felt in May and June, accounting for sizable bulges in the index.

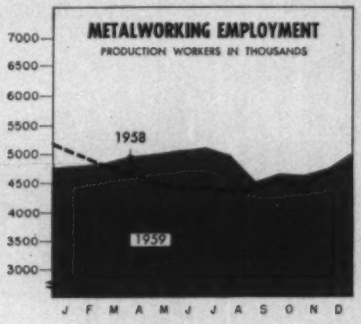
Aside from purely demand-supply factors, an examination of the revised index gives plenty of precedent for the first half upsweep. Writing for the *Bulletin* of the National Association of Purchasing Agents, Dr. Heinz E. Luedicke points out that in the ten boom peaks since 1906, June was the most frequent peak month.

• **Prices Important**—You can probably figure that by July, the race to replenish inventories will slow down a bit. And if there has been no across-the-board price action by the steel companies, the pressure to hedge will be lessened. The Fourth of July will signal an easier pace in the business community. Even after taking into account the usual seasonal factors, the production trend line is likely to dip for lack of any particular pressure to keep the first half boom going. Auto production will be a key factor. If sales in the midmonths fall even a little below expectations, you'll see a significant drawback in output schedules, which will have a tendency to slow down a large portion of the economy.

• **Acid Test**—The fourth quarter will provide the greatest test. Dr. Luedicke points out a rule of thumb: Production drops off gradually after the June peak, then gives way to a more rapid decline by the fourth quarter. "If it does not," he adds, "the odds are that business will continue to move ahead for perhaps a full year before we need to become concerned about it topping out."

Three elements could create an exception to the general rule: 1. The economy has never before gone





1958	Prim. Mtls.	Fab. Prod.	Mach-inery	Elec. Mchy.	Trans. Equip.
Dec.	275	233	244	220	266
1959					
Jan.	277	232	244	220	262
Feb.	279	233	246	221	262
Mar.	282	235	248	221	263
Apr.	283	235	249	221	263
May	284	237	250	221	264
June	284	238	250	222	266
July	281	237	250	222	266
Aug.	284	238	250	222	269
Sept.	286	239	251	223	271
Oct.	285	236	252	224	270
Nov.	277	236	252	224	267
Dec.	284	238	253	225	270

U. S. Bureau of Labor Statistics.

1958	Prim. Mtls.	Fab. Prod.	Mach-inery	Elec. Mchy.	Trans. Equip.
Dec.	943	824	1,038	789	1,208
1959					
Jan.	952	820	1,057	791	1,216
Feb.	979	817	1,090	796	1,203
Mar.	1,015	829	1,113	798	1,226
Apr.	1,037	840	1,126	803	1,229
May	1,051	853	1,153	814	1,233
June	1,067	866	1,167	833	1,224
July	1,038	847	1,149	836	1,207
Aug.	628	815	1,138	849	1,132
Sept.	611	841	1,167	883	1,200
Oct.	602	812	1,147	893	1,208
Nov.	965	805	1,139	887	1,001
Dec.	1,018	839	1,163	890	1,147

U. S. Bureau of Labor Statistics.

through a three month steel strike. Nobody knows for sure what effects it will have on cyclical business behavior. 2. This being an election year, some effort probably will be made to keep the economy near top level performance. 3. If there has been no steel price action by election day, manufacturers probably will resort to hedging against the almost certain increases in December when wage increases take effect. If steel mills run at even 90 per cent of the first half rate, the fourth quarter as a whole should be nearly as high as the second.

• **Keeping the Rule**—If the trend line runs along the line plotted on Page 53, it will still be within another rule discovered by Dr. Luedicke in his analysis of the revised index. "No business upturn has ever peaked out in the fall, although it sometimes has been early fall before the fact was realized that a downturn had been underway for several months." While there could be a moderate pickup from the third quarter, it would still fall short of the record level of the second. The downtrend could be slightly modified by the factors noted above.

In the final analysis, the second half could resemble the corresponding period of 1957, prior to the adjustment of 1958. But it does not necessarily follow that we're in for another recession like that one—especially if you watch your inventories closely.

Trend Line Inches to Record

STEEL's industrial production index portends fulfillment of at least the first step in the FRB index's climb. During the week ended Jan. 16, the trend line inched its way to another record. At a preliminary 183 (1947-49=100), it topped the previous week's revised rating by 1 point. While steel output, railroad freight carloadings, and output of electricity were holding near their earlier levels, auto and truck production advanced to the highest point in over four years. At 206,594 units, it does not appear that auto producers have much room left for improvement unless they institute wholesale Saturday work. With sales showing less than desired strength, that is not likely during the next couple of weeks.

The outlook for the rest of January is for sustained strength in the over-all picture with minor fluctuations on either side of the current level.

SPEED-BAND®
Capewell's new concept in band saw blades is setting new production records
ON ALL KINDS OF JOBS
ON ALL KINDS OF MATERIALS
ON ALL KINDS OF MACHINES
Ask your Capewell Distributor for the complete story.
Available only from Capewell Distributors
INDUSTRIAL DISTRIBUTORS THE RIGHT HAND OF PRODUCTION
CAPEWELL
THE CAPEWELL MFG. CO.
HARTFORD 2, CONN.

NEW GIANT AT WORK on Double Diamond Gears

This huge, continuous, carburizing, hardening and draw furnace now permits even greater instrument control in heat treating DOUBLE DIAMONDS for maximum wear resistance and load-carrying capacity. So far as we can discover no more efficient furnace could be installed to achieve the quality characteristics our gear customers have come to expect.

At your request, our gear engineers would be pleased to describe this process in greater detail and to explain, as well, what our recently expanded facilities can mean in terms of this pledge: "DOUBLE DIAMOND Gears offer the advantages of lower installed cost and economical and dependable service on the job . . . gears that do credit to your product and reputation."

EATON

AUTOMOTIVE GEAR DIVISION
MANUFACTURING COMPANY
RICHMOND, INDIANA

GEARS FOR AUTOMOTIVE, FARM EQUIPMENT AND GENERAL INDUSTRIAL APPLICATIONS
GEAR-MAKERS TO LEADING MANUFACTURERS

A. J. FISHER JR.
M&T exec. v. p.

ADOLPH A. KARRASCH
Hercules Motors v. p.-mfg.

A. P. MILLER
Acme-Newport president

JAMES D. McLEAN
Stromberg-Carlson president

A. J. Fisher Jr. was elected executive vice president, **Metal & Thermit Corp.**, New York. He became general manager of the Welding Products Div. when it was formed in 1958. Previously, he served as general sales manager.

Adolph A. Karrasch was elected vice president-manufacturing, **Hercules Motors Corp.**, Canton, Ohio. He will also be responsible for purchasing department activities. Mr. Karrasch joined Hercules early in 1959 as director of manufacturing. He was with International Harvester Co. for 22 years. **William P. Porch** was elected treasurer of Hercules.

Kenneth M. MacQuarrie was named manager of **Bridgeport Brass Co.'s** newly acquired plant in Warren, Ohio. Obtained from the government, it will be used to manufacture aluminum sheet and mill products. Mr. MacQuarrie was manager of the Flemington, N. J., plant.

G. W. Schlutius was elected president, **Mississippi Valley Structural Steel Co.**, Decatur, Ill. He succeeds **E. T. Blix**, retired. **J. C. Arntzen** was elected executive vice president.

D. H. Blackmar was appointed chief metallurgist for **Talon Inc.**, Meadville, Pa. He was with LeRoi Div., Westinghouse Air Brake Co.

Harold B. Schott fills the new post of assistant to the president, sales, **Brown & Sharpe Mfg. Co.**, Providence, R. I. **Joseph E. Kochhan** succeeds Mr. Schott as general sales manager, Industrial Products Div.

A. P. Miller was elected president, **Acme-Newport Steel Co.**, Newport, Ky., subsidiary of Acme Steel Co. He was vice president-general manager.

Gordon R. Anderson fills the new post of executive vice president-operations at the Beloit, Wis., Div. of **Fairbanks, Morse & Co.** He was the division's vice president-general manager. **H. E. Hanson** becomes acting manager.

Albert J. Jehle Jr. was made general sales manager, Automotive Div., **Budd Co.**, at Detroit. He was sales representative for the division.

Clifford H. Price was made chief engineer; **Mills C. Tourtellotte** assistant chief engineer, **Gulf States Tube Corp.**, Rosenberg, Tex., subsidiary of Michigan Seamless Tube Co.

R. L. Frederick fills the new post of executive director - International Div., **Timken Roller Bearing Co.**, Canton, Ohio.

Leonard L. Robb was made assistant general manager, **Alemite & Instrument Div.**, Chicago, Stewart-Warner Corp. He is succeeded by **Earl A. Fiene** as head of original equipment sales. Mr. Fiene was manager of Stewart-Warner's Detroit sales office.

Ohio Steel Foundry Co., Lima, Ohio, promoted **George D. Griffiths** to assistant vice president-roll sales; **Charles L. Flanigan** manager, eastern roll sales; **Frank B. Stauffer** manager, western roll sales.

James D. McLean was elected president of **Stromberg-Carlson Div.**, Rochester, N. Y., General Dynamics Corp. He will also become a senior vice president of General Dynamics. He assumes his duties after Feb. 15. Formerly president of Hoffman Laboratories Div., Hoffman Electronics Corp., Los Angeles, he will succeed **Robert C. Tait** as division president. Mr. Tait, a senior vice president of General Dynamics, will be associated with the corporate office, assuming new corporate-wide responsibilities. **Allan R. Shilts**, Stromberg-Carlson controller, fills the new post of division vice president-general manager.

E. A. Mercner succeeds **Ralph E. Sharp** who retires Feb. 1 as manager of sales, rod, and wire products, **Bethlehem Steel Co.**, Bethlehem, Pa. Mr. Mercner was assistant sales manager.

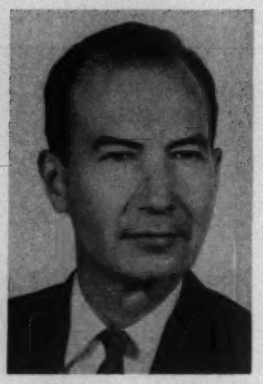
Curtis Machine Div., Jamestown, N. Y., Carborundum Co., appointed **Richard D. Rutt** production manager; **Paul W. Joy** manager-technical branch; **Adolph C. Carlson** manager, Machine Design Dept.

S. P. Gaston was made assistant sales manager-cold finished products, **Vulcan-Kidd Steel Div.**, Aliquippa, Pa., H. K. Porter Company Inc.

Bernard H. Anderson was elected vice president, **Marcus Transformer Co.**, Rahway, N. J. He continues as treasurer.

F. Karl Hellinger was elected a vice

RAUL H. FRYE



J. ALAN STEWART

Sparton Electronics management posts

B. F. GIRA

H. J. PETERSEN

United Industrial officers

president, **Rochester Ropes Inc.**, Rochester, N. Y.

Raul H. Frye was made general manager; **J. Alan Stewart** operating manager, **Sparton Electronics Div.**, Jackson, Mich., Sparton Corp. Mr. Frye was assistant general manager and marketing manager, Defense Products Div., Fairchild Camera & Instrument Corp. Mr. Stewart was production manager at Loral Electronics Corp.

Edward W. Young succeeds **A. C. Buttfield**, retired, as president of **Vulcan Detinning Div.**, Sewaren, N. J., Vulcan Materials Co. **Gordon W. Goldrick** was elected vice president-operations to succeed Mr. Young.

Paul H. Magnus II, vice president, **Rosedale Foundry & Machine Co.**, Pittsburgh, was elected executive vice president.

Peter W. Miller was made sales manager of **Link-Belt Co.'s** Caldwell plant in Chicago. He succeeds **Hubert J. McCormick**, who will specialize on sales of package handling systems.

John Robertson was appointed product sales manager-rolled sections, **Van Huffel Tube Corp.**, Warren, Ohio.

H. E. Blaine was made production control superintendent of Western Brass strip operations at the East Alton, Ill., plant of **Olin Mathieson Chemical Corp.'s** Metals Div. He transfers from the division's New Haven, Conn., brass plant where he was chief industrial engineer. Mr. Blaine replaces **James R. Higgins**, resigned.

Robert H. Coburn and **William A. Grant** were made district sales managers, Electronic Controls Section, Budd Co. Mr. Coburn is in Detroit; Mr. Grant in Los Angeles.

H. I. Smith was made superintendent, Rolling Mills Dept., Pittsburgh Works, **Jones & Laughlin Steel Corp.**, to succeed **James L. McHugh**, retired. **Richard C. Ehrhardt** was made assistant superintendent.

B. F. Gira was elected president, **United Industrial Corp.**, New York, to succeed **Ellery C. Huntington Jr.**, now chairman. **H. J. Petersen** was elected executive vice president. United merged Dec. 31 with Topp Industries Corp. and officers were elected at the first organizational meeting.

Chrysler Corp., Detroit, promoted **G. H. Stover** from director of production control to general plants manager. He directs the Plymouth and Jefferson assembly plants and Wyoming export plant, all in Detroit; and the St. Louis and Newark, Del., assembly plants. **E. W. Engel** was promoted to director of production control for the car and truck assembly group.

Howard B. Gordon was made purchasing agent, Stamping Div., **Eaton Mfg. Co.**, Cleveland. **John D. Newton** joins the division as sales representative, Detroit.

J. A. Pierce was promoted to manager of technical sales, Harbison-

PAUL H. MAGNUS II

Rosedale Foundry exec. v. p.

PETER W. MILLER

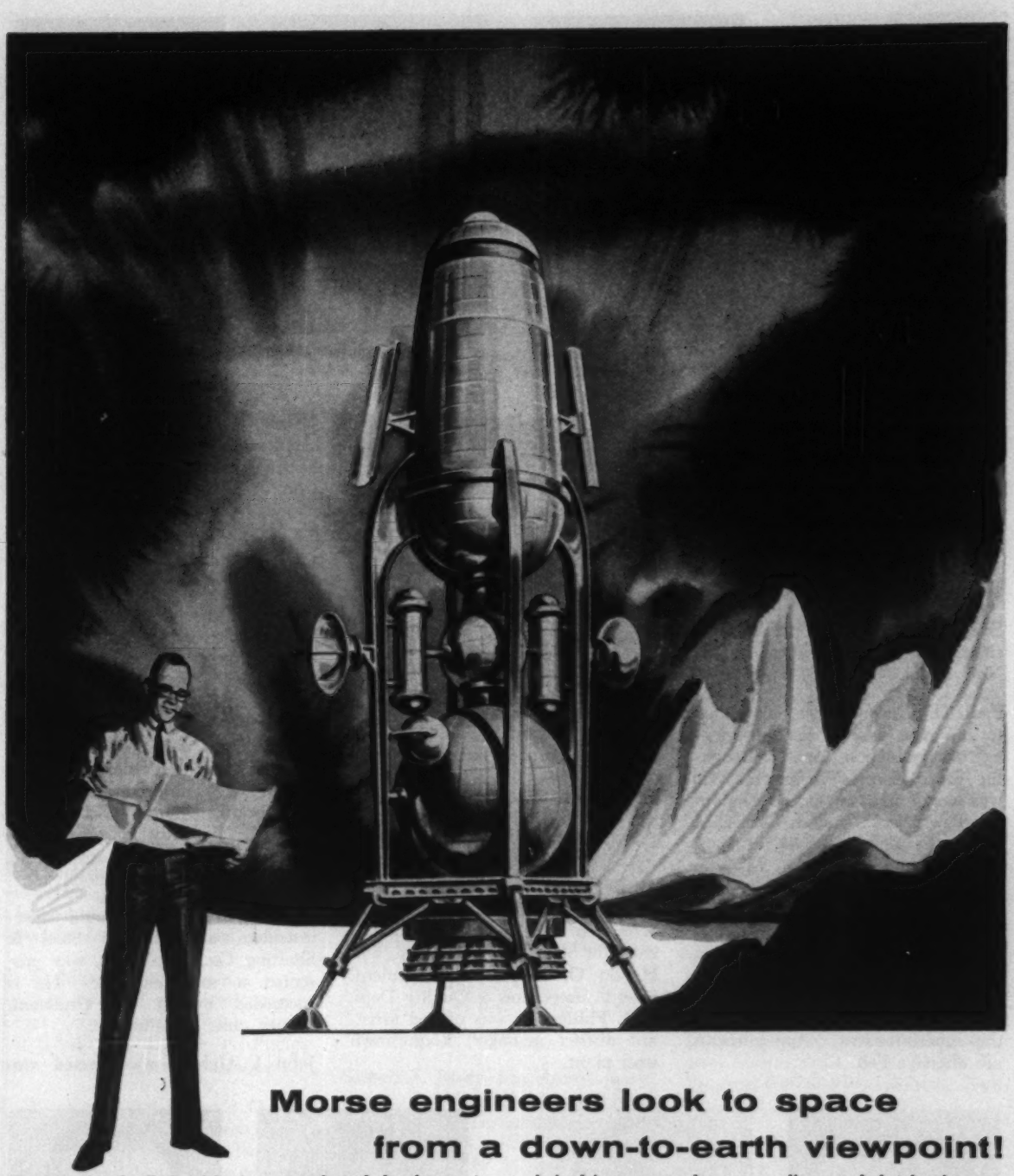
Link-Belt plant sales mgr.

H. I. SMITH

J&L rolling mills supt.

HOWARD B. GORDON

Eaton-Stamping Div. p. o.



Morse engineers look to space from a down-to-earth viewpoint!

Sky is never the limit with the research and development staff working with the broad facilities at Morse.

Morse has grown up with the automotive industry. Its specialists have worked with designers and engineers in developing and perfecting the products of their imagination.

For more than 60 years, Morse has specialized in the science of kinematics. Perhaps its best known products are basic chain drives, gear reducers, couplings, and clutches in more major fields than you could count on the fingers of both hands.

Morse engineers, supported by Borg-Warner's ultra-modern research laboratory, can now offer a better way of giving your ideas a boost, and provide down-to-earth solutions to your problems in the race for space. Consult: Morse Chain Company, Dept. 2-10, a Borg-Warner Industry, Ithaca, N.Y. In Canada: Morse Chain of Canada, Ltd., Simcoe, Ontario.

World's largest manufacturer of precision parts

MORSE BW

A BORG-WARNER INDUSTRY

LOUIS W. JANDER
Yale Materials Handling sales

GEORGE F. LYTLE
Whiting div. manager

RALPH C. CUPPER
American Forge prod. mgr.

JOSEPH W. MUELLER
American Motors div. post

Walker Refractories Co., Pittsburgh.

Louis W. Jander was promoted from assistant general sales manager to general sales manager, **Yale Materials Handling Div.**, Philadelphia, Yale & Towne Mfg. Co. He succeeds **Clyde R. Dean**, now division general manager.

Fred H. Hetzler was appointed purchasing agent, **Fafnir Bearing Co.**, New Britain, Conn.

Paul H. Devaney was appointed to the new post of general manager of production, **Jones & Laughlin Steel Corp.**, Pittsburgh. He was works manager at the Aliquippa, Pa., Works and is succeeded by **A. C. Keller**, former assistant works manager. **Lawson M. Van Ormer** succeeds Mr. Keller. **C. T. Snyder** was made superintendent, Tin Plate Dept., at Aliquippa, succeeding Mr. Van Ormer, and is in turn replaced by **Warren L. Cooper** as assistant superintendent. **Robert H. Smith** was made assistant to the superintendent. Appointments are effective Feb. 1.

Whiting Corp., Harvey, Ill., named **George F. Lytle** manager of its newly formed Pressuregrip Div. Pressuregrip is the brandname of a new vacuum lifting system for material handling. Mr. Lytle developed the new equipment. Before joining Whiting, he formed and headed Vac-U-Lift Co. of Salem, Ill., later sold to Ziegler Corp.

Ralph C. Cupper was named manager, forged products, **American Forge & Mfg. Co.**, McKees Rocks, Pa. He was with Baldwin-Lima-Hamilton Corp. in Burnham, Pa.

Hiland Hall was made assistant to the director of sales, **Heli-Coil Corp.**, Danbury, Conn.

At **Republic Steel Corp.**'s Warren, Ohio, steel plant, **William E. Schnitgen** was made superintendent, Hot Strip Finishing Dept., and **Harold O. Ripple** superintendent, Steel Conservation & Quality Dept. **J. R. Phillips Jr.** was named assistant district manager, Youngstown steel plant.

Joseph W. Mueller was made manager of manufacturing, Automotive Div., **American Motors Corp.**, Detroit. He is succeeded as works manager of the Kenosha, Wis., plant by **Donald H. Monson.**

National Tube Div., U. S. **Steel Corp.**, elected **Truman H. Kennedy** vice president-operations; **Robert E. Williams** vice president-sales. Headquarters are in Pittsburgh. Effective Feb. 1, Mr. Kennedy succeeds **Edmund G. Price**, elected executive vice president of the division. Mr. Williams will succeed **Henry J. Wallace**, elected division president. **Arthur W. Thornton** transfers to the Lorain, Ohio, Works to succeed Mr. Kennedy as general superintendent. He was assistant to the vice president-operations.

Malcolm C. Hulse, tube mill superintendent at **Columbia Steel & Shafting Co.**, Pittsburgh, was promoted to sales engineer. He is succeeded by **M. D. Ottaviani**, former chief metallurgist.

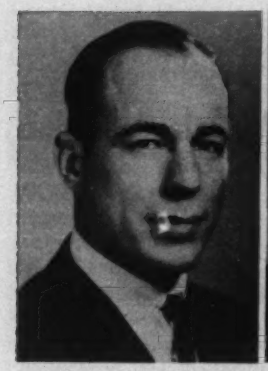
John J. Uphues was elected vice

PAUL H. DEVANEY

A. C. KELLER
J&L production operations posts

WILLIAM E. SCHNITGEN

HAROLD O. RIPPLE
superintendents at Republic Steel's Warren plant



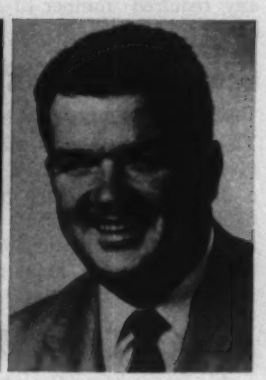
J. DAVIDGE WARFIELD
Veeder-Root marketing mgr.

CHRISTIAN F. BEUKEMA
Oliver Iron Mining pres.

EVERETT G. COUCH JR.
Chas. Taylor prod. mgr.

S. E. SMITH JR.
Weldon Tool gen. sales mgr.

P. J. MAZZIOTTI
Dana-R&D mgr.



HUGHES W. OGILVIE
GE dept. marketing mgr.

president, C. O. Henriksen Co., Chicago.

S. E. Smith Jr. was named general sales manager, **Weldon Tool Co.**, Cleveland, succeeding J. H. Devlin, vice president-sales, retired.

P. J. Mazziotti was named manager of research and development, **Dana Corp.**, Toledo, Ohio. **Myron M. Schall** and **Orville E. Phelps** were named assistant managers.

F. Gordon Doerr succeeds **George Mittleman**, retired, as New York district sales manager, Faultless Caster Corp. He is succeeded as Indianapolis district sales manager by **Joe Barr.**

Peter J. Calcagno was made manager, mechanical engineering section, **American Machine & Foundry Co.'s** Greenwich Engineering Div., Electro-Mechanical Laboratory at Stamford, Conn.

Dr. H. K. Hughes was named Physics Dept. director at **Continental Can Co.**, Chicago.

Hughes W. Ogilvie was named manager - marketing for **General Electric Co.'s** Medium Steam Turbine, Generator & Gear Dept., Lynn, Mass. He succeeds **Harry W. Lawson**, named manager-user industries sales for the central district (Chicago), Apparatus Sales Div. Mr. Ogilvie was manager-marine sales, Aircraft & Marine Div., San Francisco.

Solbert J. Barsy was elected president of **Michaels International Corp.**, New York, subsidiary of Hyman-Michaels Co., Chicago. He succeeds **Everett B. Michaels**, elected chairman. Mr. Barsy continues as manager, Steel Div., parent firm.

All officers of **Consolidated Iron-Steel Mfg. Co.**, Cleveland, headed by **Llewellyn S. Cawrse**, president, have been re-elected.

William Wraith Jr. was elected an assistant vice president of **Anaconda Co.**, New York. He is succeeded as metallurgical manager by **Thomas K. Graham.**

J. Davidge Warfield was made manager of marketing for **Veeder-Root Inc.**, Hartford, Conn. He was with Delta Star Electric Div., H. K. Porter Company Inc. in Chicago, as marketing manager.

Christian F. Beukema was appointed president, **Oliver Iron Mining Div.**, Duluth, U. S. Steel Corp. He was president of Michigan Limestone Div. Mr. Beukema succeeds the late **Rudolph T. Elstad.**

Everett G. Couch Jr. was made production manager, **Chas. Taylor Sons Co.**, Cincinnati, subsidiary of National Lead Co. He was manager of the firm's refractories plant at Taylor, Ky., and is succeeded by **Raymond B. Lippincott Jr.**

Joseph H. Conway was made electronic sales manager, **Addressograph-Multigraph Corp.**, Cleveland. He succeeds **Albert F. Wike**, recently made sales research director.

Richard T. Kelton was made western regional sales manager, **Sutorbilt Corp.**, Compton, Calif.

OBITUARIES...

Henry B. Rust II, 47, a vice president, **Rust Engineering Co.**, Pittsburgh, died Jan. 8.

Emanuel Singer, 53, vice president, **H. Kramer & Co.**, Chicago, died Jan. 12.

A. F. Siebert, 81, president, **Milwaukee Electric Tool Corp.**, Milwaukee, died Jan. 11.

Edward J. Richardson, 50, national product manager, alloy, tubing, and cold finished steel bars, **Joseph T. Ryerson & Son Inc.**, Chicago, died Jan. 11.

Jules F. Boand, retired general superintendent of the Chicago branch plants of **National Lead Co.**, died Jan. 9.

Ray N. Wheelock, 62, director, Engineering Dept., **Hercules Powder Co.**, Wilmington, Del., died Jan. 13.

Kendall D. Doble, 64, president, **Pneumatic Scale Corp.**, Quincy, Mass., died Jan. 14.

Leon H. French, 76, retired vice president, **American Brass Co.**, Waterbury, Conn., died Jan. 11.

Sharon Steel Corp. Cuts Order Processing from Days to Minutes

A $1 MILLION installation of an IBM computer system has cut Sharon Steel Corp.'s time for processing orders from days to minutes. The system employs complete order entry, facilities loading, scheduling, inventory control, billing, and invoicing programs. Full beneficial operation is expected by midyear.

James A. Roemer, chairman, says: "Ultimately we plan to process all paperwork to adequately record all production data, and to assemble and schedule all the orders our company may have over a given period of business. We also plan to feed data to the equipment on which important managerial, sales, market research, purchasing, metallurgical, research, engineering, and production decisions can be based."

• **Equipment**—The 14 tons of IBM equipment installed in 3019 sq ft of working area at the Roemer Works, Farrell, Pa., comprise 14 separate components which are the working elements of the 650 tape Ramac computer.

Programing for the computer under the department headed by C. W. Diven Jr., assistant to the president, has been in progress for a year. The 650 console has the capacity to read, write, perform arithmetic operations, sort, collate, and summarize desired information, all with the speed of light. The system can perform 78,000 additions and subtractions a minute and, when so instructed, can make logical programed decisions at the rate of 2300 a second.

• **Procedure**—When a new order is received, it is sent to the metallurgical department to determine the method of processing the steel. That usually requires three days. Thereafter, a customer product record is key punched and added to the file on magnetic tape. An order item card is punched. It gives the date of purchase order, Sharon's file reference, quantity orders, date requested, and other pertinent data. The card is fed to the computer.

The computer searches the file and produces the multilith mat required to process the order, along with the customer acknowledgement. When a repeat order is handed the data processing department, the customer's order item card is fed to the computer and information obtained in a matter of minutes. The computer can process any required number of repeat orders per day.

Canmaker Acquires Plant

Phelps Can Co., Weirton, W. Va., purchased the Nestle Co. factory at Burlington, Wis., including a 35,000 sq ft factory building, a 6500 sq ft warehouse, and other buildings. Resumption of production is scheduled to start as soon as tin plate shipments are received.

American Can to Build

American Can Co., New York, plans to construct a metal canmaking plant at Astoria, Oreg., with a capacity of 100 million cans annually. Completion is expected in time to meet needs of the 1960 summer canning season. A plant with a similar capacity is being built at Eugene, Oreg., at an estimated cost of more than $500,000.

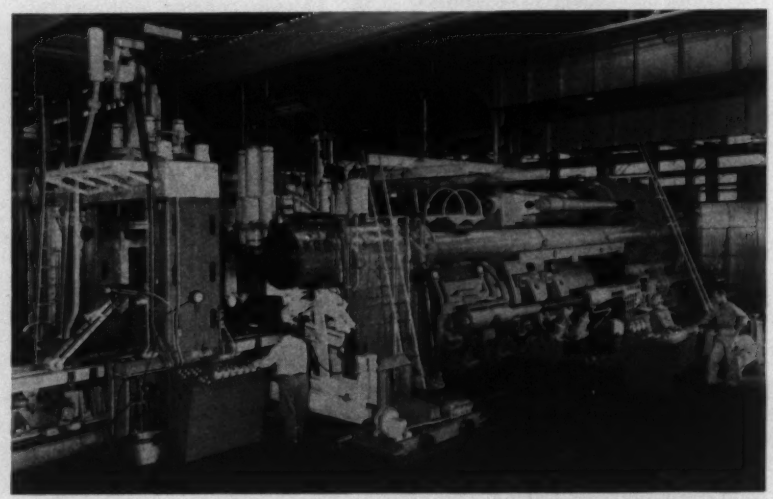
Forms Wheatland Conduit

Wheatland Tube Co., Wheatland, Pa., is launching a $400,000 expansion project following completion of a $325,000 improvement program. The company has formed an associate firm, Wheatland Conduit Co., for production of rigid steel electrical conduit. Equipment is being installed for production, galvanizing, and processing of the conduit.

Buys Shipbuilding Firm

National Steel & Shipbuilding Co. has been organized to acquire the business and physical assets of the shipbuilding facility formerly operated by National Steel & Shipbuilding Corp., San Diego, Calif. The new firm is jointly owned by Henry J. Kaiser Co., Oakland, Calif.; Morrison-Knudsen Co., Boise, Idaho; Macco Corp., Paramount, Calif.; and F. E. Young Construction Co., San Diego. Kaiser Engineers Div., Henry J. Kaiser Co., will provide the direction of the company's activities.

Officers of the firm are: Chairman and president, E. F. Kaiser; executive vice president, M. F. Fillius Jr.; treasurer, D. E. Browne; sec-



THIS 14,000 TON EXTRUSION PRESS increases the availability of large extruded shapes for civilian users of aluminum. It has been installed alongside its twin at the Lafayette, Ind., Works of Aluminum Co. of America. It can extrude single pieces up to 39 in. wide in extreme lengths and weighing as much as 2500 lb. Outsized shapes formerly were available almost exclusively to the military

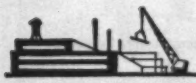
retary, David Hardy; and assistant secretary and assistant treasurer, H. O. Tracy and J. E. Lents, serving in the dual capacity.

Enters Welding Field

Ransome Co., Scotch Plains, N. J., has purchased the complete welding positioner business of Worthington Corp., Harrison, N. J. Manufacturing operations are continuing at the Worthington plant in Plainfield, N. J., while a new Ransome manufacturing facility is underway. Paul Galton is general manager of Ransome Co., a wholly owned division of Big Three Welding Equipment Co., Houston.

Waltham Buys Motor Div.

Waltham Precision Instrument Co., Waltham, Mass., purchased the Electric Motor Div. of Advanced Products Co., North Haven, Conn. Production of subminiature synchronous motors is being moved to Waltham.



NEW PLANTS

Mingo Oxygen Co., a joint venture of Hydrocarbon Research Inc. and Wheeling Steel Corp., is constructing an oxygen generating plant at Mingo Junction, Ohio. The $6 million plant will sell oxygen to Wheeling Steel and liquid oxygen and argon to industrial users. Initial capacity: 400 tons a day.

Superior Hone Corp., Elkhart, Ind., is building a 15,000 sq ft plant at Erwin, Tenn.

Uddeholm Co. of America Inc., New York, is opening a specialty steel service center at 2175 Berlin Turnpike, Newington, Conn. The center will stock Swedish quality spring and tool steels.

Associated Testing Laboratories Inc., Caldwell, N. J., will move into a 30,000 sq ft building in Wayne, N. J., early this year.

National Cylinder Gas Div., Chemetron Corp., Chicago, is producing high purity liquid nitrogen and argon at its new plant at Dallas. Glenn Gammon is NCG district manager.

ASSOCIATIONS

New officers of the Institute of **Scrap Iron & Steel Inc.**, are: President, Milton K. Mahler, Morrow Steel Co., Detroit; first vice president, E. J. Moskowitz, Schiavone-Bonomo Corp., Jersey City, N. J.; second vice president, Harry Marley, Abe Cooper-Syracuse Inc., Syracuse, N. Y.; treasurer, Ralph N. Kopelove, Kopelove Iron & Metal Co., Inc., Dayton, Ohio; secretary, I. D. Shapiro, United Iron & Metal Co., Baltimer. W. S. Story has been named assistant executive vice president and director of public relations.

Industrial Heating Equipment Association, Washington, elected these officers: President, W. E. Benninghoff, Ohio Crankshaft Co., Cleveland; vice president, H. J. Pugsley, Swindell-Dressler Corp., Pittsburgh.

C. A. Crawford has been retained as technical director of the **Investment Casting Institute**, Chicago. He will supervise and co-ordinate the technical programs of the institute, including research work and development of metal specifications and other standards.

John Veckly, director of advertising, U. S. Steel Corp., Pittsburgh, has been elected treasurer of the **Association of National Advertisers Inc.**, New York.

Diesel Engine Manufacturers Association, Washington, elected these officers: President, E. L. Miller, Cooper-Bessemer Corp., Mt. Vernon, Ohio; executive secretary, R. L. Stanley; vice presidents, George Steven, Worthington Corp., Buffalo, and W. E. Butts, General Metals Corp., Oakland, Calif.

NEW ADDRESSES

Detroit Steel Corp., Detroit, moved its Milwaukee district office to 6729 W. Capitol Dr., that city. The office is in charge of W. V. McClelland.

Nu-Matic Grinders Inc., Cleveland, moved its headquarters and manufacturing operation to 875 E. 140th St., Cleveland 10, Ohio. The firm makes abrasive finishing wheels, portable belt sanders, inflatable drum sanders, and floor mounted sanding machinery.

Hooker Chemical Corp., Niagara Falls, N. Y., moved the Los Angeles sales offices of its Durez Plastics Div. and Western Chemical Div. to 6277 E. Slauson Ave., Los Angeles 2, Calif.

CONSOLIDATIONS

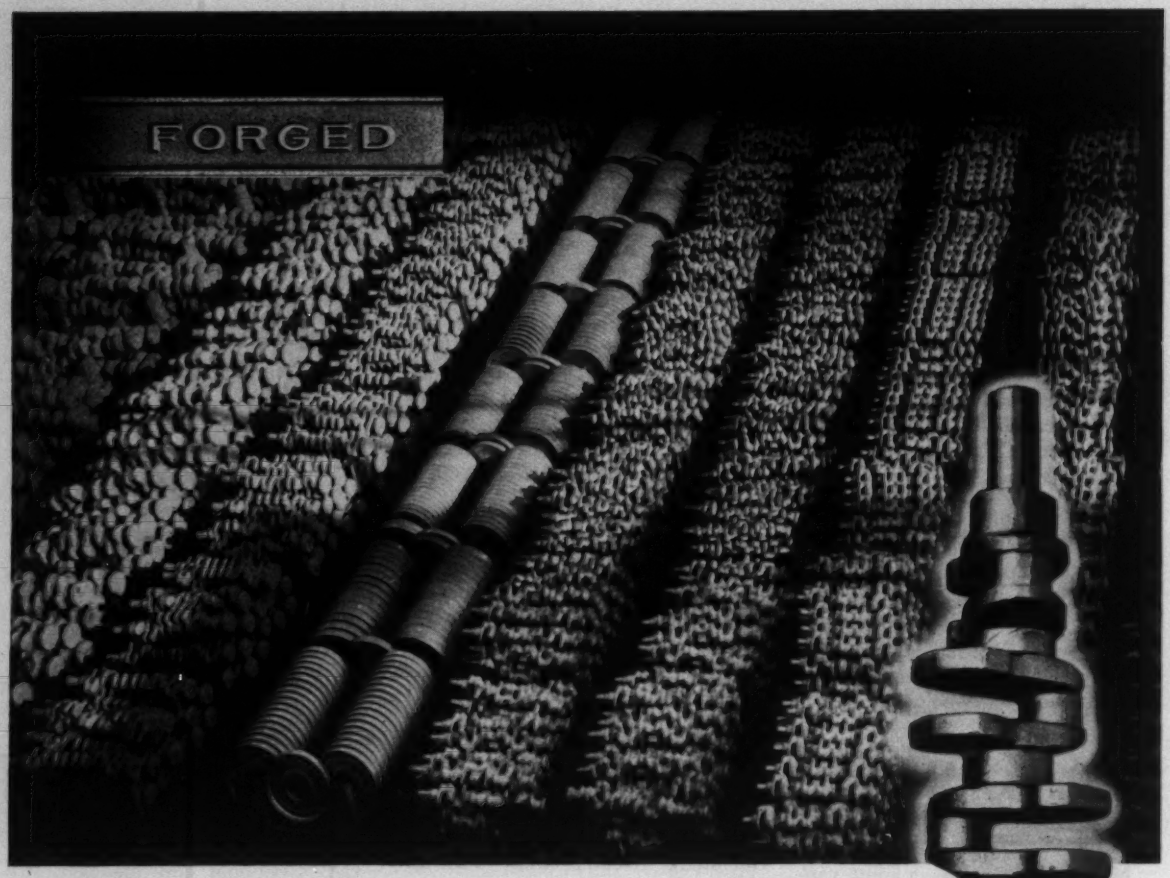
United Aircraft Products Inc., Dayton, Ohio, purchased **Western Way Welding**, Gardena, Calif., and will operate it as its Western Div. The division's specialized welding and general machinery equipment will be supplemented by additional metal fabricating equipment. Engineering and research facilities also will be enlarged. George Palmer is general manager of the division. Louis B. Peltier, UAP's regional sales manager, will move from Burbank, Calif., to Gardena.

Virginia Metalcrafters Inc., Waynesboro, Va., purchased **Copar Inc.**, Laurel, Md., maker of garden tractors.

Sundstrand Corp., Rockford, Ill., acquired **Thayer Scale Corp.**, Pembroke, Mass., manufacturer of industrial processing scales. The firm is active in development of scale systems used in weighing solid rocket fuels used in guided missiles.

U. S. Systems Inc., Minden, Nev., purchased **Modern Die & Tool Corp.**, Los Angeles. H. C. Smith has been named president and general manager of Modern Die.

Buell Engineering Co. Inc., New York, producer of electrical and mechanical dust collecting equipment, purchased **Northern Blower Co.**, Cleveland, producer of dust collectors and filtering equipment. The property will be operated as the Northern Blower Div. under the direction of L. A. Eiben, vice president.



On their way to move men, merchandise—or mountains

For a nation on wheels and on the wing—a production run of forged crankshafts and jet engine compressor wheels for the builders of power-plants for pleasure cars, trucks, earth-moving equipment, and aircraft.

In missile development, too, Wyman-Gordon has proved the value of forging in achieving the highest strength-weight ratios, at elevated temperatures.

With forging experience dating prior to the birth of the internal combustion engine; with the greatest hammer and press capacity in the country; with unexcelled laboratory facilities; Wyman-Gordon is anxious to serve you at the design, engineering and purchasing stages of your developments.

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WYMAN-GORDON

FORGINGS

of Aluminum Magnesium Steel Titanium . . . and Beryllium Molybdenum Columbium and other uncommon materials

HARVEY ILLINOIS — WORCESTER MASSACHUSETTS — DETROIT MICHIGAN

GRAFTON MASSACHUSETTS — FRANKLIN PARK ILLINOIS — LOS ANGELES CALIFORNIA — FORT WORTH TEXAS

RADIOACTIVE TAPE MEASURE—Soviet steelmakers are controlling the quality of charge material, measuring burden levels, and checking the movement of burden and hot metal with radiation gages, latest reports indicate. Other applications: Refractory wear in stacks; impurity absorption in open hearth molten steel; slag analysis. Republic Steel Corp., Cleveland, has also developed such systems (STEEL, Oct. 12, 1959, p. 120).

SOFTER TUNGSTEN—A newly discovered form of tungsten is softer, less brittle, and more formable than the ordinary kind, declare researchers at the Bureau of Mines, Albany, Oreg. Biggest difference noted: Crystals are much smaller than those of melted grades.

ALTERNATING HEAT—A new high temperature cesium cell changes heat directly into alternating current, say scientists at General Atomic Div., General Dynamics Corp., San Diego, Calif. It is one of several direct conversion systems being studied.

MORE ON ALTERNATING HEAT—A ferroelectric converter employing special ceramic sections develops 1000 volts when exposed to heat, says International Telephone & Telegraph Corp., New York. The device gives promise of developing outputs up to 1 million volts.

TUBELESS ULTRASONICS—A tiny device called a trinistor has been substituted for the vacuum tubes in an ultrasonic generator, states Westinghouse Electric Corp., Pittsburgh. Advantages claimed: Generator weight cut 80 per cent, size 50 per cent; performance and reliability improved.

FORGEABLE COLUMBIUM—A co-operative experiment produced a forged ring 7¾ in. OD, 6 in. ID, and ⅞ in. thick. Material: Columbium with 0.75 per cent zirconium. Ladish Co., Cudahy, Wis., and Union Carbide Metals Co., a division of Union Carbide Corp., New York, say they want to demonstrate the forgeability of a commercial alloy. Most work to date has been with ultrahigh purity metal.

STRONGER HONEYCOMB—Honeycomb made of a modified 5056 aluminum alloy is said to be up to 30 per cent stronger than previous aluminum honeycombs. Hexcel Products Inc., Berkeley, Calif., says the most significant change is an increase in magnesium content.

BIGGER TANTALUM SHEETS—You can get tantalum sheets 36 in. wide and 72 in. long at regular commercial prices, says Kawecki Chemical Co., Boyertown, Pa. First sheets are 0.020 in. thick, but heavier and longer ones can be rolled.

CERAMIC-METAL BONDING—A process using Invar, Kovar, and Rodar has simplified the problem of brazing metals to ceramics. Developed by Metallurgical Consultants Inc., Maywood, Calif., the bonds withstand 1100° F.

AUTOMATIC TOOLHOLDER—A novel holder permits insertion of new carbide tips and chip breakers without disturbing machine setups, claims Carbide Tool Co., Detroit. Chip breakers are changed like blades in an injector razor.

FAST SCRUBDOWN—An acid solution of nitric, sodium bifluoride and sodium dichromate cleans the surface of X2020 aluminum for spot-welding at Ryan Aeronautical Co., San Diego, Calif. That is followed by a hydrofluosilicic acid treatment which reduces surface resistance to less than 10 microhms for 48 hours, says Doris Brown, chemist, who developed the treatment.

THREE-WAY CHECKER—Seals which retain lubricants in bearings are being checked 100 per cent by an automatic air gage which rejects those with eccentric shapes, faulty bonds, or no springs, says General Motors Research Laboratories, GM Corp., Detroit.

Trio Calls the Shots

L. M. Cole, vice president, sales, Warner & Swasey Co., Cleveland, says three basic challenges influence future developments in standard machine tools.

● **Broadening physical characteristics of customers'** work. This includes the necessity for working with a broader range of materials, more complex part shapes, both larger and smaller pieces, and much tighter tolerances.

● **Transition in the relative importance of manufacturing cost factors.** We have made far greater strides in machining speeds than in handling efficiency on standard machines. Efficiency of setup is also important in meeting our customers' needs.

● **Working environment for machines will change.** We are able to rely less and less on the skill and knowhow of operators, must rely more on mistakeproof machines. Numerical control aims squarely at the problem.

Machine Tool Builder Looks Ahead

The ability of one machine to handle a wider variety of parts is one of the important trends in standard machine tools. User problems dictate it and other trends

MACHINE tool builders, like all capital equipment makers, are faced with the job of helping customers improve their profits in what will be the most competitive decade in our history.

How do builders evaluate the challenges? How do they propose to meet the new problems? What machine developments or trends will they emphasize?

To get some of the answers, STEEL talked with Lester M. Cole, vice president, sales, Warner & Swasey Co., Cleveland, a builder of standard machine tools. Here, in a report of that conversation, Mr. Cole reveals his company's thinking:

Q: Mr. Cole, what are the principal challenges facing the standard machine tool industry in the sixties?
A: There are many challenges, but I think we can group them into three main categories. First, we are challenged by changing physical characteristics of our customers' machining work. Second, the relative importance of different manufacturing costs is in transition. Third, the working environment in which machine tools must operate will undergo further change. All of those changes will affect the designs of future machines.

Consider the first one, changes in machining characteristics. We have heard and read much about the problems of machining some of the exotic new materials required by missile age products. The problems are spectacular, but they are only evidence of a general problem. Many of our customers outside the aircraft and missile industry face a broader range of materials, both harder and softer.

New, or simply more complex, shapes are encountered by missile makers. Some of them are nearly impossible to machine by conventional methods. Then, too, industry generally is broadening the size range of its workpieces. Miniaturization leads us off in one direction. At the same time, the world's biggest steam shovel, turbine, and similar products are tugging from the other end of the scale.

Ever tightening tolerances are part of the picture. In some production lines, we can turn out more precise products than we used to make in a toolroom. Parts that used to have one tight tolerance now have several that are critical.

Q: What trends in machine designs will be aimed at solving those problems?

A: We think the way to tackle the materials problem is with more rugged machines. We have increased machine rigidity so they can take greater torques. We have increased speed and feed ranges and have added horsepower.

Q: Your industry has been accused of a reluctance to look for entirely new ways to machine some of the problem metals. Is the charge justified?

A: I would say that we are not interested in searching for dramatic new ways of fashioning exotic metals just for the sake of finding something new. We must consider the economics involved. Research is costly, and ours is not a big industry. Our whole industry shipped less in dollars than any of several of the leading missilemakers in 1958. We simply cannot afford to spend millions of research dollars for answers that will benefit only a small segment of our market.

Our own company, for example, manufactures general purpose machines. The majority of our customers are companies employing, let's say, less than 500 people. We must remain primarily concerned with metalworking shops that will still be machining steel, iron, brass, and traditional alloys. In short, we do not feel that the peculiar problems of the aerospace industry are going to be problems of our broad market. Of course, this attitude will change if the new materials begin to come into common usage. Then our research would hold promise in a broader market.

Meanwhile, we are interested in co-operative engineering projects with the aerospace industry. The projects could help that industry get the equipment it needs, and could help us because we might be able to apply what we learn to some of the problems of our standard customers.

Q: You mentioned the challenges of new shapes, sizes, and tolerances. What are you doing about them?

A: Well, certainly, both tracer machining and continuous path numerical control have alleviated problems with complex shapes. In-

"We think the way to tackle the problem of tougher materials is with more rugged machines, with increased rigidity, increased speed and feed ranges, and added horsepower"

"We'll see more immediate emphasis on the handling portion than on the cutting portion of the cycle. Automation has (helped) long run jobs"

"Tomorrow's standard machines will have to be less subject to operator mistakes with features like preset machine cycles either mechanically or numerically controlled. They will also have to require less physical effort"

cidentally, this is one specialized problem we're glad to be dealing with. As with mechanical templates, we believe the needs for numerical path control first met in the aircraft industry will lead us into feasible numerical control applications for many other machine tool users.

As for sizes, most builders have been adding to the number of models in their machine lines. We also are building more range into each machine. We used to make nine models of turret lathes. Now we make 14. Also our No. 3 machine used to have a speed range of 67 to 1480 rpm. Now it's 45 to 2262 rpm. It can handle tough materials and smaller parts more efficiently. This flexibility, the ability of a machine to handle a wider and wider variety of parts, is one of the truly significant trends for standard machine development in the future. It means that bigger machines will have to be made more sensitive so they'll meet the final requirements of small parts.

Historically, we have met the tolerance problem by using roughing machines and then finishing machines, even though many of the so-called roughing machines of today can produce finish tolerances. With further tightening of tolerances, I think this procedure will change. Tighter specifications on the interrelationship of different part surfaces will mean that you can hold the part only once, and all work will have to be done in one setup. This portends more emphasis on automatic machines in which a wide variety of tools can be brought to the part to complete a whole series of operations. Automatic sizing devices and more automatic control (to trim the human fallibility factor) certainly are trends already underway. We will, of course, build more precision into our machines, but this is an economic problem, not a technical one. As fast as customers demand, and pay for, more precision, we will provide it.

Q: What did you mean when you said one of the major challenges had to do with a transition in manufacturing costs? Did you mean that they are going up?

A: No. Although that's true, I was referring to a revised balance of the cost ingredients. For example, in the machining cycle, we'll see more immediate emphasis on the handling portion than on the cutting portion. Automation has taken care of this problem for relatively long run jobs; now the job lot industries deserve the same sort of economic gain.

Generally, we have made far greater strides in machining speeds than in handling efficiency on standard machines. In the first edition of our turret lathe operator's manual, we did a time study to show the gains with carbides. If we refigured it today to take advantage of premium carbides, we'd come up with this comparison:

1930s	Minutes
Handling	1.80
Cutting	10.60
Total	12.40

1940s	Minutes
Handling	1.70
Cutting	5.00
Total	6.70

1960	Minutes
Handling	1.60
Cutting	2.90
Total	4.50

Obviously, at least on this rather common type of part, we have done better at reducing machining time than we have at cropping handling time. Also allowing for setup time, in our own turret lathe department the tools are cutting metal only 35 per cent of the time. If we are to upgrade efficiency in that kind of department, handling and setup efficiency offer us the best chance. Machine tool builders must continue to take handling operations away from the operator and to put them in the machines. Automatic cycles are one solution. Then we must simplify and make easy all the handling functions we leave with the operator.

Q: The third challenge you mentioned was that of a so-called working environment. Can you spell that out?

A: Yes. For example, the operator who can get accurate work from an inaccurate machine through his own skill and knowledge is disappearing. So we have to make machines less subject to operator mistakes with features like preset machine cycles, either mechanically or numerically controlled. As evidence of the industry's emphasis on this problem, we expect nearly every major builder of standard machines will demonstrate at least one application of numerical control at The Machine Tool Exposition—1960.

Workers are demanding, and getting, better working conditions. Machines have to be cleaner, safer, better lighted, and must be run with less physical effort.

The challenges and solutions we have cited put more and more emphasis on the standard machine tool. Increasingly, our customers say their machines must do a wide variety of jobs, to close tolerances, on a variety of parts, rapidly, with little operator effort, and with almost no chance for mistakes once the setup is made. A machine that will meet all those needs sounds idealistic, but we feel it soon will be a reality, since each of the individual trends leading us is a necessity.

• Whatever you do next week, turn to the Servicenter—There'll be an important announcement.

Pulsating Burner to Speed Production of Copper

Pulsating type burners, built by E. W. Bliss Co., Canton, Ohio, will be installed in all 700,000 lb capacity copper reverberatory furnaces at Anaconda Co.'s Great Falls, Mont., plant to shorten melt cycle time and reduce fuel consumption.

Under the present system, any melt time lag by the first and second shifts idles the first shift waiting to cast. It means cutting output or losing manhours, both equally costly. The Bliss burner reduces the furnace cycle by delivering full tonnage ahead of schedule.

Fuel consumption is reduced 12 per cent per ton. The burner can reach 3450° F with No. 6 fuel oil and above 3300° F with 1000 Btu per cu ft natural gas. The high temperatures can be obtained without the addition of oxygen, steam, or preheated air required by other equipment.

• **Principle**—The key to such results: Improved mixing of fuel and air. A series of small steady "explosions" takes place within the burner. They create extremely high turbulence and result in combustion efficiency.

The velocity near the center line of the Bliss burner is about 600 feet per second and the release rate is 5.5 million Btu per cu ft.

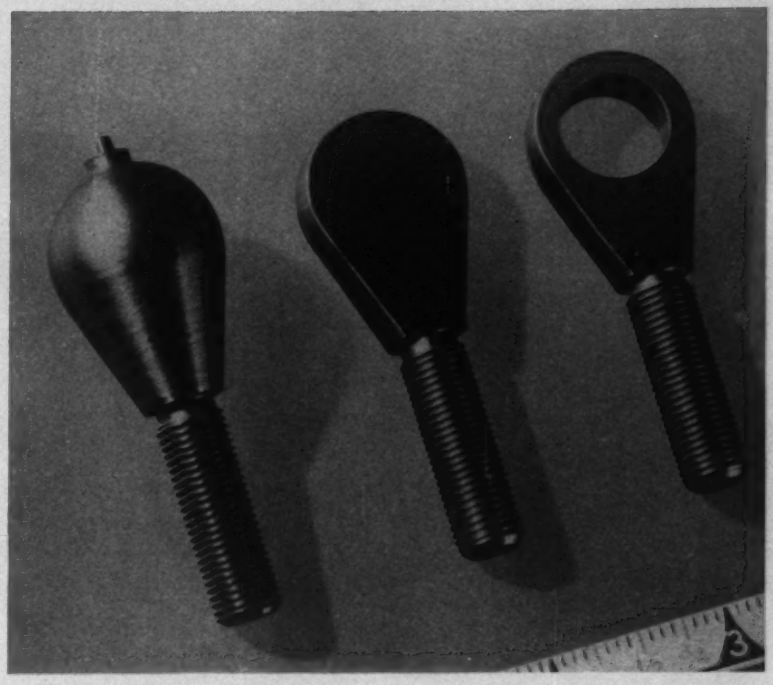
• **Versatile**—Bliss says the new burners are being used in plants ranging from steel and foundry applications to dry cleaning establishments. They can be used in many types of industrial heating processes which could never before use gas or oil.

Forging Cuts Valve Cost

Use of one piece forgings permitted a 20 per cent cost reduction on valves made for Eclipse Fuel Engineering Co., Rockford, Ill.

The forgings are produced by National Cored Forgings Div., Bridgeport Brass Co., South Norwalk, Conn.

• If you're a man of action—read the Servicenter next week.



Poor surface finish created problems when part was made from chrome-molybdenum steel. Burrs on threads picked up too much cadmium plating. Stainless requires no plating

Free Machining Stainless Upgrades Missile Part

A CRITICAL MISSILE part is sharply improved when made from a free machining stainless instead of chrome molybdenum steel, says Perfecting Service Co., Charlotte, N. C.

The company, working on a subcontract for the Charlotte Div., Douglas Aircraft Co., practically eliminated rejects which used to average some 25 per cent. It also increased production 80 per cent, eliminated several operations, and cut over-all costs.

• The subcontractor suggested the change. Douglas approved when it was assured that costs would not be increased and quality would be improved.

Originally, the part was made from 1 in. round, AISI 4130, heat treated steel (tensile 125,000 to 145,000 psi) turned on a turret lathe and cadmium plated. Perfecting Service had trouble holding tolerances and finishes. Threads came out far rougher than desired. Although straddle milling was no great problem, it couldn't hold a 63 rms finish on two flats, so they had to be surface ground. The part was then drilled and reamed.

No matter how close tolerances were held, cadmium plating rejects were high because of plating build-up on feather edges of the threads. Vapor blasting and buffing solved that problem, but costs were increased.

An AISI Type 416 stainless eliminated cadmium plating (parts are now passivated at small cost). Machinability of the stainless sparked a production increase of 80 per cent. The turret lathe operator who used to produce 75 pieces a day now turns out 130 to 135.

Part goes into a hot size press for flange modification and wrinkle removal. Pressure is applied alternately from different sides, then part is set for specified dwell time

Hot Sizing Helps Alloys Meet Closer Tolerances

Heat and pressure, applied to preformed parts in a tool or fixture, eliminate severe wrinkles; they also correct curvature, flatness, and flange angle

SPECIAL SHAPING techniques are often needed for high temperature alloys to meet close dimension tolerances and prevent cracking.

Advice on hot sizing of PH 15-7 Mo and 17-7 PH (alloys developed by Armco Steel Corp.) and General Electric's Rene 41 is offered by F. J. Peterson, general foreman, extrusion and sheet fabrication, at the Los Angeles division of North American Aviation Inc.

• Hot sizing is the finishing of preformed parts with pressure and heat (below forging temperature) in tools or fixtures.

Several methods are available; each lends itself to particular applications. One employs the hot size press, which consists of a heavy frame and lid, heating platens, and hydraulic cylinders for applying high pressures to the parts. Flange angles and severe wrinkles can be corrected in the press by applying pressure alternately to different sides, then setting the parts for the specified dwell time, which is relatively short because tools are always up to temperature.

Another method makes use of the solid hot size fixture. The part is secured in the tool with clamps and wedges, then placed in a furnace. Time in the furnace depends on the part, mass of tooling, and furnace recovery time. The parts are usually loaded and unloaded at 400 to 500° F. The method can be used to correct flatness and contour, or to remove wrinkles.

Lightweight, egg crate fixtures can also be used to correct contour in aircraft skins and doublers, or to help parts retain their shape during heat treat and aging cycles.

• Thermal growth of tooling materials should be as close as possible to that of the material being sized. Transformation growth is also important.

These Factors Affect Hot Sizing Results:

Creep Resistance
Compressive Strength
Pressure Applied
Soak Time
Thermal Expansion
Transformation Growth
Tooling Material and Design

If thermal growth of tools and parts cannot be matched, compensation for the difference must be incorporated in tool design.

Pressures and temperatures to be applied are also vital in the choice of tooling materials. Most popular: Ductile cast irons, hot and cold rolled steel, and H-6 tool steel.

Transformation growth, which occurs in PH 15-7 Mo and 17-7 PH, must also be considered. Tools can often be machined to net size. But some parts (such as a pressed frame, surrounded by flanges) may require tooling that compensates for transformation. Other factors: Tolerances, part size, and fabrication sequence.

• Room temperature fabrication is usually satisfactory for Rene 41, but hot sizing is recommended in special cases.

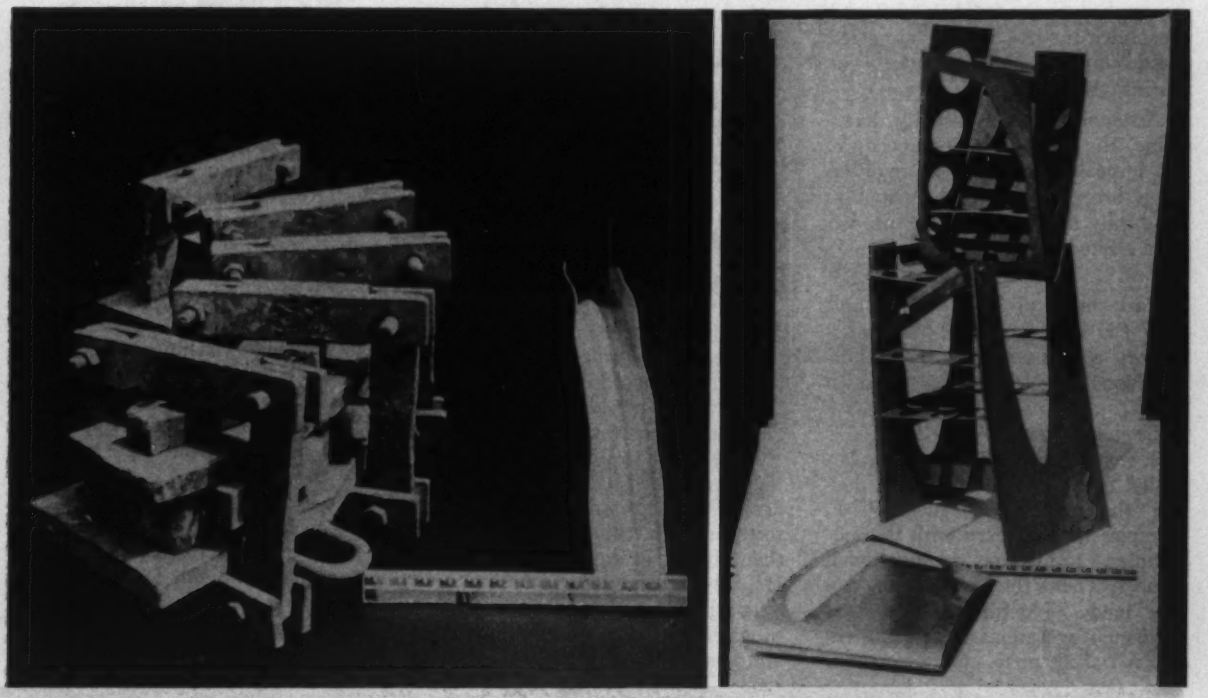
Relatively little hot sizing has been done with the alloy; tests in progress may lead to wider application.

The material has high compressive yield and creep resistance at high temperatures. It is difficult to hot size at 1000 to 1200° F. As aging occurs (around 1100° F), the material becomes brittle and compressive yield increases. The material must be sized with extreme care at those temperatures, if close tolerances are required. For good results, parts may have to be rerun. And cracking may result in highly stressed areas.

Higher temperatures lead to other problems. Tooling materials that can withstand heat, pressure, and scale are hard to find, and personnel safety is more of a problem. Rapid heating and cooling are hampered by bulky tools, and stress cracks may appear in the part because of the material's hot short range.

• Configuration of hot sized Rene 41 parts is satisfactory, but close tolerances are hard to meet.

Pressed parts were processed 15 minutes at 1175° F in a hot sizing press with hot rolled steel tooling. The parts were almost wrinklefree and showed improvement in the



Parts clamped and wedged in a solid fixture (left) are placed in a furnace for hot sizing. Egg crate fixture (right) prevents deformation when aircraft parts are heated

flange angle. But close tolerances weren't met.

The fixture and furnace technique was used to size a stretch formed angle. The part was mounted in a warm fixture and placed in a furnace at 1175° F for 20 minutes, then cooled in the fixture. The parts showed improved shape, but close tolerances couldn't be held on flatness, curvature, and flange angles.

Straight angles, encased in high silicon ductile Meehanite during the aging cycle at 1400° F, were kept in their fixtures for different periods. Parts removed after 5 hours showed about 50 per cent improvement; angles that stayed in the fixtures for the entire aging period (16 hours) were improved about 75 per cent.

• Good results are obtained in hot sizing PH 15-7 Mo and 17-7 PH. Higher temperatures are needed for the PH 15-7 Mo because it has slightly better properties at room or elevated temperatures.

The materials can be conditioned by thermal or refrigeration heat treatment. Sizing techniques can be applied to material conditioned by either method in the annealed state, during transformation, or during the aging cycle.

Assembly methods usually determine the conditioning procedure. An annealed part may be required in a brazed honeycomb assembly, or a fully aged part may be needed in a riveted or welded structure.

• Parts made of PH 15-7 Mo and 17-7 PH were hot sized with satisfactory results in configuration, dimensions, and metallurgical properties.

Stretch formed Z-sections of 17-7 PH were clamped in a warm, hot rolled steel fixture, and sized during the aging cycle at 1050° F. Samples were checked with thermocouples, to insure proper dwell time. Then the production run was made. No further fabrication or bench operations were required; normal sheet metal tolerances were met.

A cold, rubber formed angle of the same material was loaded into a hot, H-6 tool steel die and processed 10 minutes in a hot size press at 1050° F. Vertical and horizontal pressure were applied while the part was heated and soaked. The part was then air cooled to room temperature. Configuration was good. Transformation was not triggered; the part remained annealed because temperature stayed below 1225° F and sizing time was less than 30 minutes.

A stretch formed angle of PH 15-7 Mo was clamped in a warm fixture, heated to 1225° F for 15 minutes, then cooled in the fixture. The part matched the fixture perfectly. Transformation was prevented by holding temperature under 1225° F, so the part would remain in the annealed condition.

Another PH 15-7 Mo part (a straight angle) was hot sized as it cooled from the 1400° F austenite conditioning temperature. It was clamped in a fixture that was preheated to 270° F. After sizing, it was cooled to 60° F. When the material is heat treated at 1400° F and aged at 1050° F, it has a transformation range of 250 to 60° F. If the heat treated material is fixtured so it will be guided as it grows and transforms, it can be made into almost perfect parts.

The material can also be aged and hot sized simultaneously at 950° F in a hot size press or an oven fixture.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Produce Tungsten Ingots By Indirect Sintering

A new process for producing tungsten ingots weighing up to 200 lb is announced by Dr. Paul Schwarzkopf, president of Schwarzkopf Development Corp., New York.

Blocks 8 in. in diameter and 8 in. high are formed from tungsten powder in large presses, sintered indirectly in high temperature furnaces, then forged at high temperatures, Dr. Schwarzkopf reports.

In the direct sintering method, tungsten powder is pressed into bars and heated by direct passage of current. The compacted powders are consolidated at a temperature below the melting point of tungsten. The only shortcoming: The weight of the bars is limited to about 20 lb.

Saves Diesel Block

YOU can reclaim leaky diesel engine blocks with impregnation, says Prenco Products Inc., Royal Oak, Mich.

Microporosity is eliminated, and the casting is thoroughly sealed with batch-type techniques. Porlox C metal oxide in the sealant meets the specifications of the engine manufacturer.

The leaky castings as-received are fully machined with crankshaft bearing caps. Only production "leakers" are returned. Two autoclaves handle 24 blocks an hour.

Here is the procedure:

1. Six blocks are loaded in an autoclave.
2. A high vacuum, held for 12 minutes, opens the casting pores.
3. Heated sealer is drawn into the autoclave and held for 12 minutes at 100 psi.
4. Sealer and castings are removed, rinsed in cold water and rust inhibitor.
5. Cylinder bores are rubbed with oil and crankshaft bearing cap retaining bolts are loosened.

Sealed blocks are tested and returned to the engine manufacturer.

Lifting Magnets, Rolls Replace Manual Jobs

Permanent magnet units are being used to handle cold rolled sheets in a line producing distribution transformer tanks at Westinghouse Electric Corp., Athens, Ga. One of the ways they cut costs: By replacing manual operations.

Heading the line is a magnetic destacker supplied by National Electric Welding Machines Co., Bay City, Mich. Lifting magnets pick up sheets (20 by 38½ in. through 48 by 69 in.) and raise them against driven magnetic rolls which feed them to a conveyor.

The conveyor is equipped with Eriez magnetic rolls and passes the sheets to units such as the numbering machine and roll former. The lifting magnets and magnetic rolls were produced by Eriez Mfg. Co., Erie 6, Pa.

• You can be in line for $1000 —Read the Servicenter Feb. 1.

Can you put your finger on machining economies like this?

Cost of 800 brazed single point tools at approximately $3.50 each

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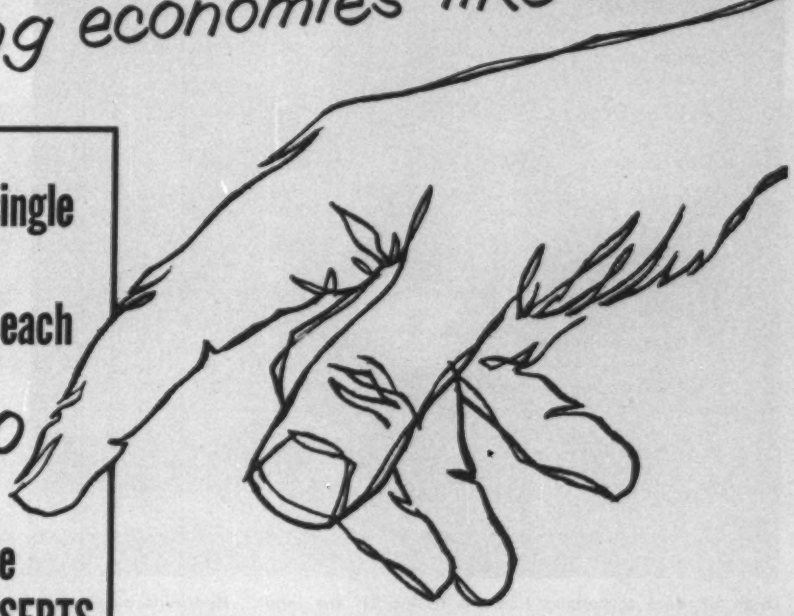

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Over 9 styles and 109 sizes Carmet cadmium plated tool holders. 6 carbide grades for machining almost all materials from wood and plastics to high alloy steels.

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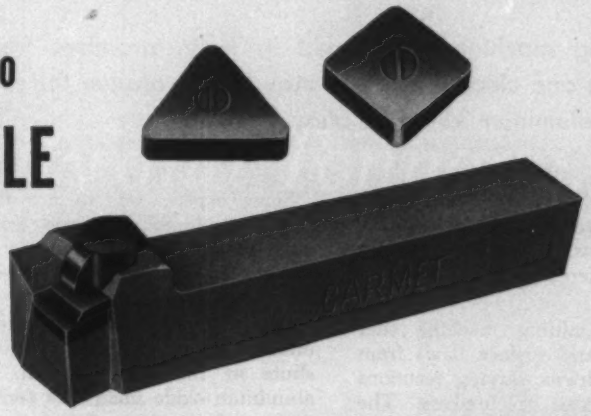

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Is Ingot Peeler Practical In American Steelmaking?

Hot milling machine, developed in Italy, promises faster processing and cleaner steel; it may be the answer for small ingots of aluminum killed or alloy steel

ALL STEELMEN are interested in more effective elimination of ingot surface defects. But they often decide on different ingot processing methods.

A giant milling machine that peels scale and surface flaws from hot ingots draws varying reactions from American steelmakers. The machine, usable on ingots up to 5 tons, was developed in Italy by Societa Generale per l'Industria Metallurgica e Meccanica, Milan.

• Defects must be removed to insure good product quality, but heat losses and downtime should be avoided.

Some experts say surface flaws can be reduced by more careful mold preparation, especially in carbon steels. But aluminum killed or alloy steels are hot short and susceptible to defects. Gas inclusions under the outside metal layer, cold shuts in the ingot bottom, and aluminum oxide inclusions (on the surface of aluminum killed ingots) are the most common causes of surface irregularities in rolled products.

In some cases, defects are removed before ingot processing. But the steel must first be cooled to room temperature; it must be reheated before it is rolled. And internal stresses cause cracks, especially in alloy steel, unless cooling is controlled. Such cooling takes time and increases product cost.

Alloy steel ingots have to be heat treated before machining, and large machines are needed to process big ingots.

Elimination of flaws after rolling solves some problems but generates new ones. Irregularities are often enlarged or exaggerated, affecting a larger volume of metal. Increased metal surface on rolled material adds to inspection time.

Carbon steel ingots can be scarfed effectively, if oxygen is available in quantity at a reasonable cost.

• Makers of the ingot peeler say it solves the processing problem, removing flaws while the steel is hot.

Ingots aren't cooled. That reduces the danger of cracking; heat losses are minor.

Annealing isn't necessary, as in cold processing. That permits a shorter manufacturing cycle and reduced handling costs. And the machine is said to be faster than other processing methods.

• Ingot stock containing flaws is milled off by a large, multicut tool.

Square ingots, stripped at about 1450° F, are heated to 2200° F and sent to the peeling machine for milling of the four faces.

Roller ways carry hot ingots on and off the feeder table, which is positioned by a hydraulic cylinder. A bracket on the feeder holds the face of the work in place as it moves past the cutter.

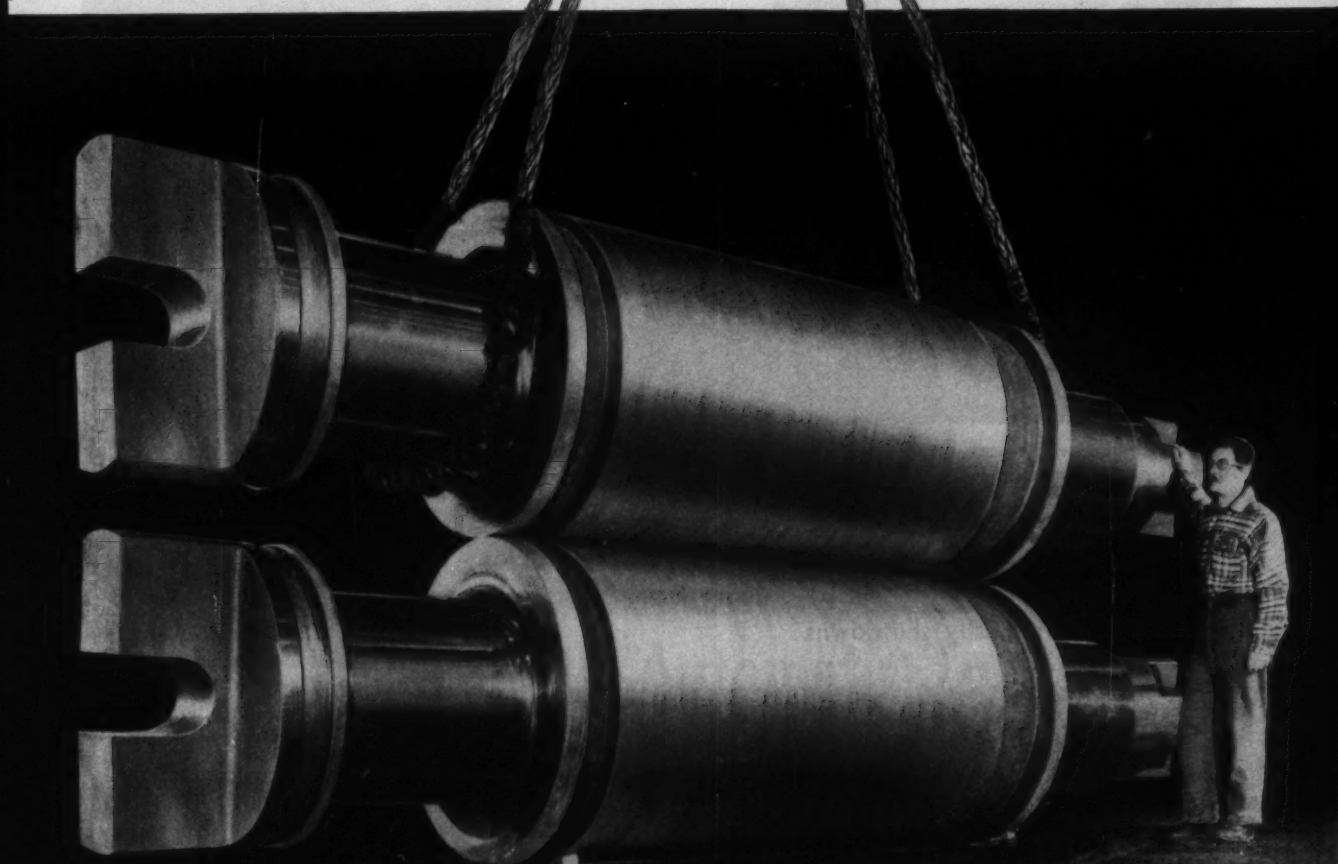
A hydraulic manipulator turns the ingot after each face is milled, so the four sides can be peeled successively. Water cooling holds cutter blade temperature at about 200° F.

• Some steelmen are skeptical; but they say the big mill could be successful in special applications.

A layer $\frac{1}{2}$ in. or more thick is peeled off each face of the ingot. The material can be remelted, but some say too much metal is lost.

Several American steel producers make ingots too large for the peeler. They doubt that the machine will be used extensively for large, carbon steel ingots. But they say it should be useful for smaller ingots of aluminum killed or alloy steels.

MESTA ROLLS



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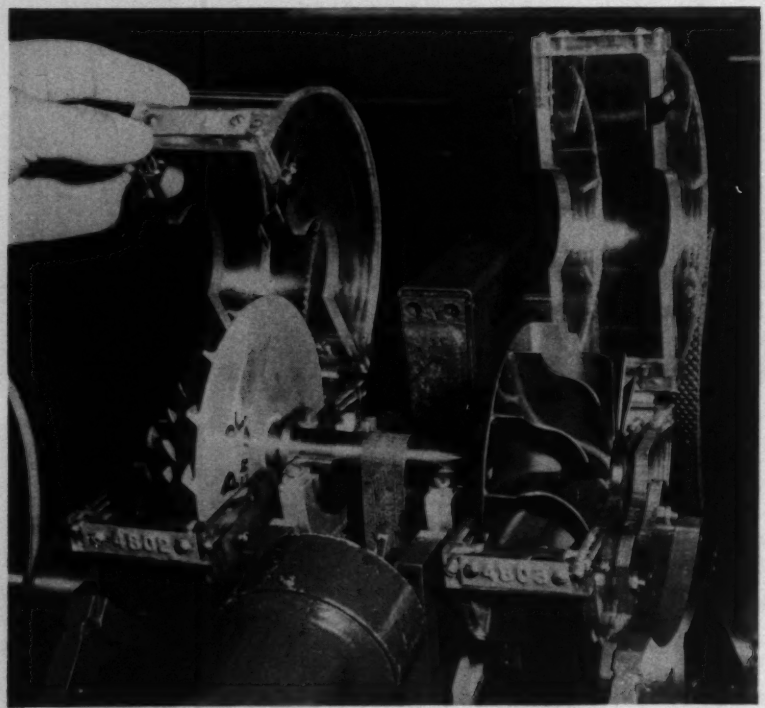
Balancing Speeds Design, Production

Caterpillar engineers process parts like these through the balancing machine. All work is done in short lots

Precise measurement of high speed parts has helped tractor builder solve design problems before production gets rolling. It prevents costly shutdowns



A vibration tolerance of 0.000025 in. is held on this turbosupercharger by balancing it on this machine. In service, the part operates at 50,000 rpm. A meter on the machine shows the amount of metal to be removed

RESEARCH and development men at Caterpillar Tractor Co., Peoria, Ill., use a balancing machine to take a lot of guesswork out of the production of new parts.

It helps to answer the challenge of smaller, lighter, and higher speed components for tractors and engines.

• Most parts are handled in one or two piece lots.

Accurate balancing of parts while they are still in the prototype stage permits the design engineers to make early decisions about where metal can be added or taken off. Decisions are reached before the parts go into production, avoiding costly production losses and eliminating extra design changes.

On a typical job, a turbosupercharger for a 6 cylinder diesel engine is loaded in the 31S balancing machine built by Gisholt Machine Co., Madison, Wis. The part has a 6 in. diameter and a ¾ in. bearing shaft. It weighs 4 lb and operates at 50,000 rpm.

The job requires two-plane balancing with correction at both ends of the large diameter wheels. Setup takes only 30 minutes. Unbalance is measured and located in 2 minutes. A grinding operation corrects for out of balance. The part is balanced to a tolerance of 0.000025 in. vibration at the bearing surfaces.

Tool Cuts, Welds

Hamilton Standard gets rights on electron beam unit developed by foundation in West Germany

EXCLUSIVE North American rights to make, use, and sell an electron beam machine developed by the Carl Zeiss Foundation, West Germany, have been acquired by Hamilton Standard Div., United Aircraft Corp., Windsor Locks, Conn. The unit is a combination cutting tool and welding machine.

The process uses a controlled high density stream of electrons to change matter physically or chemically. It can cut slots and drill, or surface treat, melt, or weld virtually every known material (including tungsten and the exotic new metals).

• **Cutting**—Holes as small as 0.0008 in. in diameter can be drilled. Energy density during drilling runs as high as the equivalent of 600 million watts per square inch.

As a high production process, it is capable of handling up to 10,000 jewel watch bearings in a load, drilling each in about 6 seconds.

• **Welding**—Used as a welding machine, it handles stainless steel for aircraft and missile structures, producing T sections 0.060 in. thick from sheet stock at a rate of 2 ft per minute. It will buttweld 3/8 in. stainless steel at 1/3 in. per second. In laboratory tests, it has welded through 1 in. of stainless.

A typical installation comprises six basic elements:

• An electron gun that develops a precisely controlled beam of electrons of high density that can be directed to do work on a target. The target material is heated, melted, or vaporized according to the level of energy density in the beam.

• A vacuum chamber and worktable within the chamber on which the target is mounted.

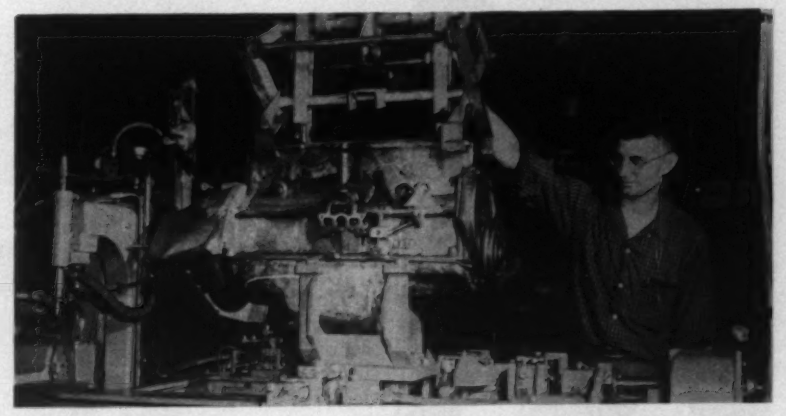
• A high vacuum pumping system (it reduces atmospheric pressure to about that found at 400,000 ft altitude).

• An electronic control system for manipulating the electronic deflectors and lenses that control the size and programing of the beam.

• A precisely regulated high voltage power supply.

• Miscellaneous monitoring instrumentation.

• **Potential**—Charles M. Kearns, general manager at Hamilton Standard, says that the machine is a "technological advance of major significance to the field of electronics, atomic power equipment, missiles and aircraft, basic metals, engine manufacturing and other major industrial areas, as well as to laboratories and research agencies."



Cradle of lifting mechanism pushes the engine block upward, locking the jaws of the tongs in the open position. That releases the block for balancing

Engine Lines Accelerated With Automatic Tongs

Jaws are shaped to take a firm grip on cylinder blocks; they release quickly at work stations, then close and carry blocks away when operations are finished

CONVEYOR SYSTEMS with automatic tongs insure safe, speedy handling of engine blocks at Chrysler Corp.'s engine plant, Trenton, Mich.

One conveyor line, installed by Jervis B. Webb Co., Detroit, uses 75 pairs of tongs to handle 6 cylinder engines. Another line, using 75 pairs of tongs made for V-8 engines, was installed by Mechanical Handling Systems Inc., Detroit.

Tongs for both conveyor lines were supplied by the Materials Handling Div., Heppenstall Co., New Brighton, Pa.

• **Tongs close automatically, taking a firm grip on the engine blocks.**

Air lifts push engine blocks upward into the open jaws of the tongs. That trips a mechanism built into the tongs, causing them to close.

Jaws of the tongs are shaped to fit the tops of the blocks. Each pair of tongs weighs 75 lb and has a 500-lb capacity.

• **Conveyors carry partially assembled engines to and from dynamic balancing machines.**

Engine blocks are carried to Gisholt balancers and positioned over air operated lifts incorporated in the machines. When an engine is lifted upward against the tongs, the jaws are locked open, releasing the assembly for balancing.

When the balancing is finished, the block is pushed upward into the tongs; jaws close automatically, and the block is on its way to the next work station.

New Techniques Pack Hidden Benefits

Revolutionary production methods may help many shop operators get around sticky restrictions of established standards or work rules, says turret lathe manufacturer

WHO NEEDS a revolutionary new production method or two?

Aircraft and missile makers, for sure. They are working with the supermetals. But don't forget the average production shop. It could be the chief beneficiary of new manufacturing methods.

Reason: It may offset underuse of present techniques.

• A turret lathe builder says many shops need problem solvers.

L. M. Cole, vice president-sales, Warner & Swasey Co., Cleveland, says: "With proper tooling and proper shop practices, some of our customers could get at least 50 per cent more production with the equipment they now have—and to varying degrees our customers themselves know this."

Then why don't those plants upgrade their productivity? Mr. Cole answers: "The additional 50 per cent cannot be obtained just by waving a wand. There are problems of the cost of training, the cost of changing accumulated standards data, the entire problem of job content, and union agreements on production. Finally, there is just plain human apathy—human resistance to change or to do anything that seems like more work."

Many shops have kept the problems well in hand and are getting excellent production from their machine tools. Other shops are frank to admit that the problems have gotten completely out of hand, almost to the point that they cannot be cured by conventional machines, even new ones. They are looking for some way to re-establish controls over their own production.

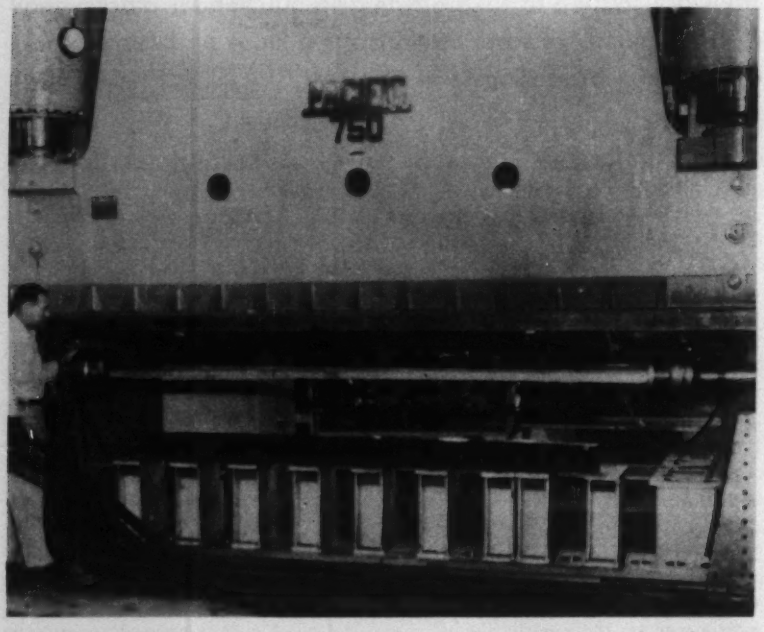
• The plight of some plants challenges builders to produce the perfect machine tool.

Many customers have said they would like to be able to control speeds and feeds in the methods, standards, or engineering departments, and to set those variables so they cannot be altered by operators.

Mr. Cole says: "They admit that they would have to use speeds and feeds which are considerably less than optimum, but they would rather do that than lose control to the operator.

"These people, rightly or wrongly, are going to be the best prospects for the radically different machines of the future, only because they so desperately need something that is radically different. They need to start all over again and to regain control of their work.

"They are presenting us with a real challenge and a real opportunity. The perfect machine of the future will be the one that cannot be misused."



TWO WAY STRETCH on this press has eliminated springback on shaped extrusions at Chance Vought Aircraft Inc., Dallas. Parts as long as 16 ft are clamped by side jaws and stretched; then the 750 ton hydraulic ram comes down to produce final shape. Press was built at Pacific Industrial Mfg. Co., Oakland, Calif.

Precision Plus

Four standards laboratories have measured a 4 in. gage block, and they agree to within 1 millionth of an inch. Three of the labs agree to within one-tenth of a millionth. The national laboratories of the U. S., England, and Germany, and the metrology laboratory at Sheffield Corp., Dayton, Ohio, did the checking. How Louis Polk Sr., Sheffield president, interprets the results: They mean that measurement to the seventh decimal place will be obtained on a commercial basis.

"Man...that Stainless Shines!"

The indestructible luster of stainless steel wheel covers is unmistakable. Stainless is the *one* metal that never betrays a car's mileage . . . or age. The highway's abrasive grit, winter's salted streets, and even harsh detergents and steam can't corrode, etch or dim its beauty.

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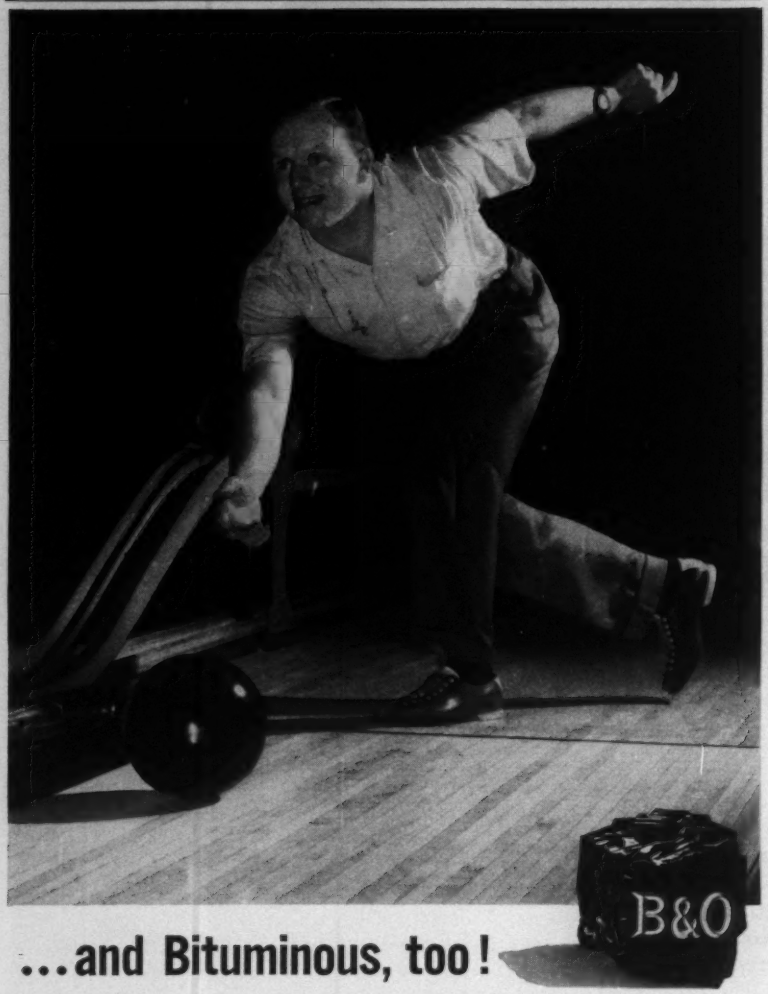

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Lubrication System Keeps Jukebox Shop Spinning

A plant-wide lubrication schedule adapted by Automatic Music Inc., Grand Rapids, Mich., has reduced the number of lubricants kept in stock from 30 to a basic six.

The schedule was drawn up after consultation with Gulf Oil Corp.

A machine repair supervisor heads the program. Two men assist him. They keep a card file listing lubrication requirements of 400 machines. Periodically, oil temperatures are recorded and oil samples taken for analysis.

Annual savings have reached a total near $10,000 since the program was launched, the company estimates. Dan VanHeteren, machine repair supervisor, states: "Our downtime has been cut by more than 50 per cent. We've been able to stock up on spare parts with the money saved. We're getting higher speeds and saving on tool wear too. Oil isn't expensive; downtime is."

Extending Special Tool Use Leads to Savings

A special machine tool can earn its keep in ways other than machining while performing its primary job better and faster.

Example: A 40 ft Cincinnati horizontal spiral miller installed by Baker Perkins Inc., Saginaw, Mich.

R. C. Reider, vice president, explains that the machine's primary job is to mill helixes for mixing screws but that it is being employed for straight milling operations on other work, keyway cutting, or slotting long shafts. He points out that such versatility can save on setup and machining time and eliminate subsequent assembly floor operations; it will also pay off in handling nonspecial jobs.

Mr. Reider says it used to take about 80 hours to produce an 8 in. diameter screw, another 65 hours of hand grinding to insure proper fit in a cylinder into which it is mounted. By machining both components on the same tool, the grinding operation was eliminated while the required tolerances were retained. Time lost during assembly was also reduced.

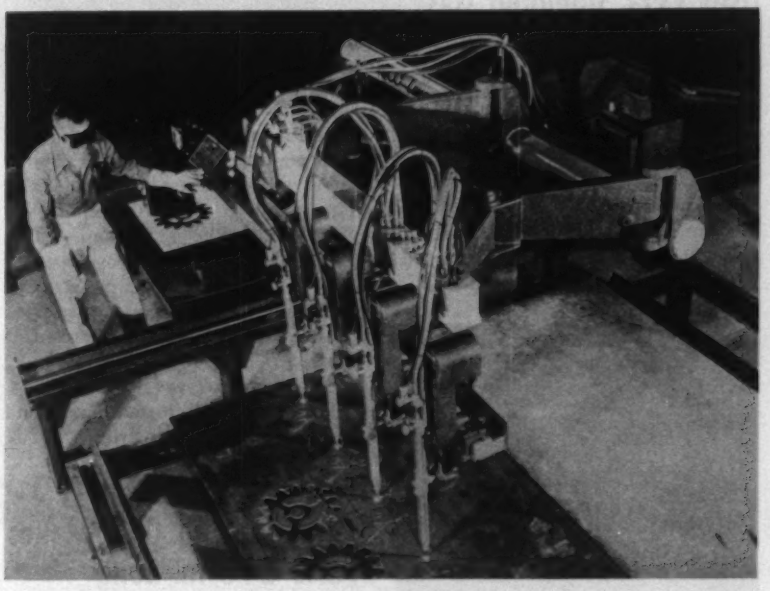
Cutting Unit Handles 8 ft Steel Plates

WITH THIS Linagraph cutting machine of pantograph design you can do medium duty shape cutting on 8 ft steel plates. The unit carries a maximum of four motorized torches for use with acetylene, propane, or natural gas. It can do shape and straight line cutting within a rectangle bounded by a 96 in. width and a length determined by the number of rails and tracks used.

The tracing area has a movable template top that measures 4 x 8 ft.

Controls for gas pressure, motorized torches, the machine carriage, and the tracing device are located above the mobile tracing table within easy reach of the operator.

The machine can be set up for left-hand or right-hand operation and can be equipped with manual, magnetic, or electronic type tracing units.



The package for the Linagraph includes 10 ft of running track.

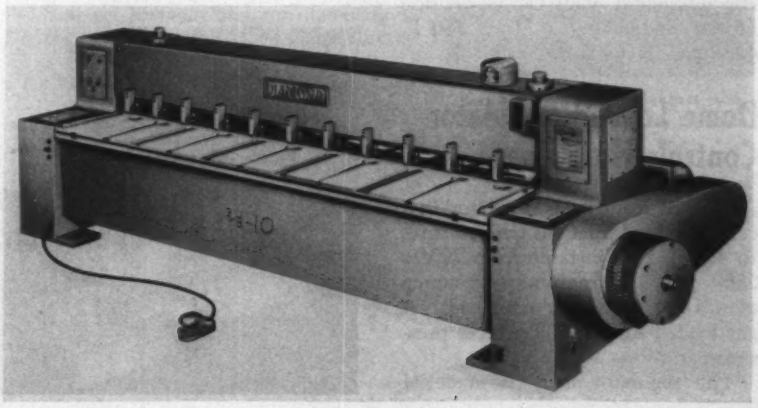
For further information, *write* Air Reduction Sales Co., a division of Air Reduction Co. Inc., 150 E. 42nd St., New York 17, N. Y.

Underdrive Power Squaring Shears Redesigned

A LINE of 3/8 series, underdrive, power squaring shears has been redesigned. The shears are available in capacities of 3/8 in. mild steel in 6, 8, 10, and 12 ft sizes. Construction is all steel.

The design includes massive square gibs with replaceable hardened and ground wear plates, and a herringbone gear drive running in an oil bath. The unit also has hydraulic hold-downs, slanted ram, air counterbalances, and Wichita air tube disc clutch and brake.

This is part of a general redesign program of the Diamond line of gap



and underdrive power squaring shears.

For further information, *write* Diamond Machine Tool Corp., 5111 Coffman - Pico Rd., Pico-Rivera, Calif.

Manual Welding Gun Uses CO_2 Shielding Gas

A MANUAL Aircomatic welding gun for mild steel utilizes carbon dioxide as a shielding gas. The air cooled gun (Model AH60-B) has a continuous duty rating of 600 amperes when "buried arc" CO_2 techniques are used. It can accommodate hard welding wires ranging from 0.035 through 3/32 in. fed from conventional wire feeders.

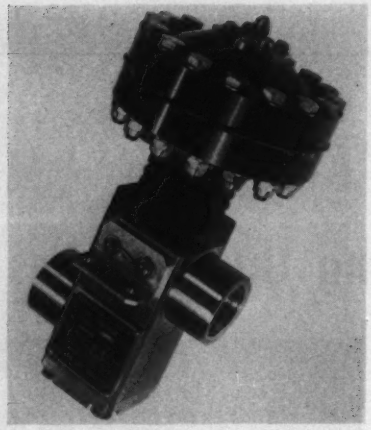
The gun has a lever type trigger and a gooseneck nozzle assembly. Cable connections have been reduced by combining the power cables and the wire casing.

For further information, *write* Air Reduction Sales Co., a division of Air Reduction Co. Inc., 150 E. 42nd St., New York 17, N. Y.

Dome Loaded Regulator Controls Hot Gases

A DOME loaded gas regulator that can withstand inlet gas temperatures to 450° F is adjustable from 200 to 2500 psig. It maintains accuracy of ±5 per cent of dome load. A gas loaded diaphragm reduces pressure variation.

The regulator body is made of



corrosion resistant steel and the seat and poppet are erosion resistant. Metal seals are used on the body. The standard unit is suitable for 450° F nitrogen regulation. The seat and packing unit can be removed and adapted to other gases and operating conditions. An extra heavy body is used for pressures over 2500 psig.

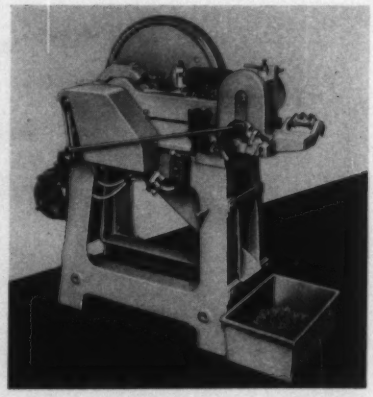
The regulator weighs 11 lb.

For further information, *write* Western Sky Industries, 21301 Cloud Way, Hayward, Calif.

Cold Heading Unit Makes Parts 2⅜ in. Long

A COLD heading machine can handle wire from 0.020 to 0.090 in. in diameter and produce headed parts to 2⅜ in. length. The unit, called the Morris-Omega Special "O," measures 41 x 40 x 20 in. and is equipped with a 1½ hp motor drive. A wide range of parts can be produced (from 60 to 100 pieces per minute).

Shear pins are located at critical points to prevent tool damage. A



one shot lubrication system is used.

For further information, *write* REM Sales Inc., Robert E. Morris Co., West Hartford 7, Conn.

Dumper Is Equipped For Angle Track Use

THE Essex Hydro-Dumper 515 operates on in-plant or outside angle tracks. It carries bulk material to any point along the trackway, stops, then dumps the load. Customers can specify skip sizes and shapes. The skip pivots 135 degrees from its loading position to the dumping angle of 45 degrees.

The Hydro-Dumper has two motors. One drives a hydraulic power pack which supplies energy to dump the skip; the other propels the unit laterally along the track.

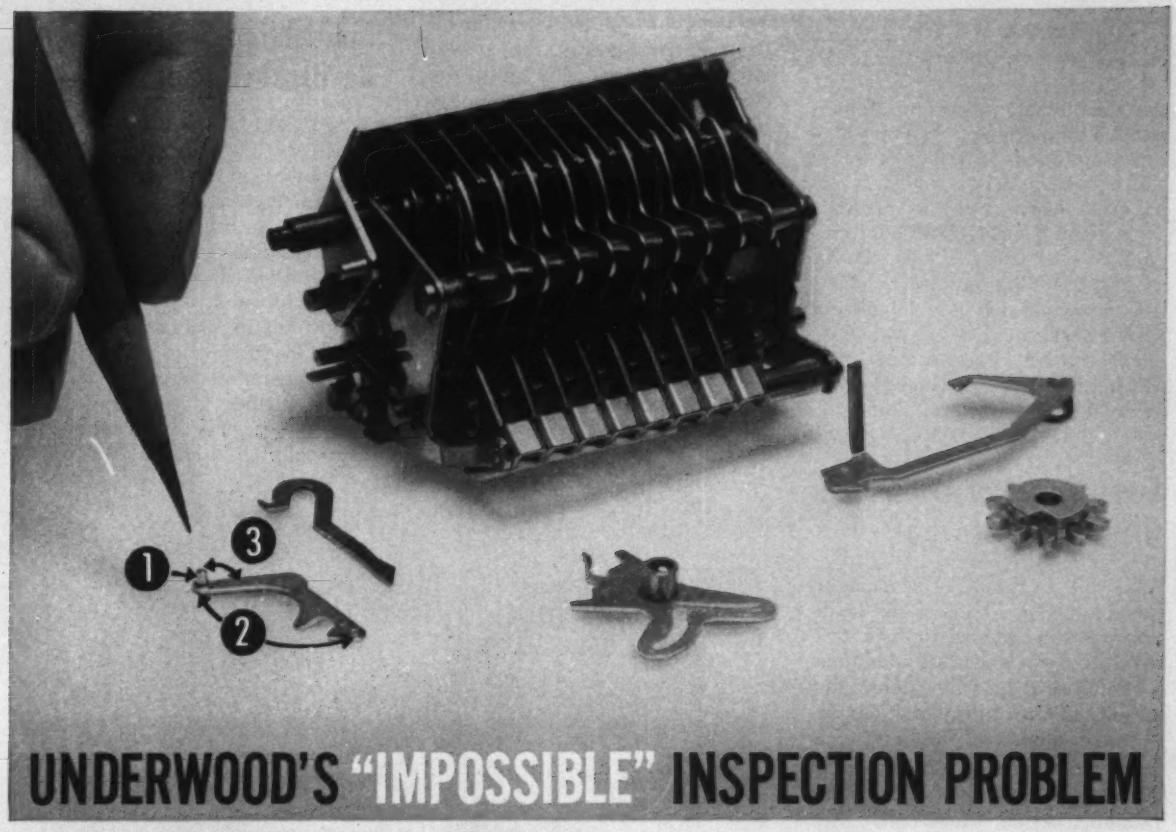
A four way valve controls the dumping operation. Two switches (one on each side) control the lateral movement.

For further information, *write* Essex Conveyors Inc., 101 Colden St., Newark 3, N. J.

Corrosion Preventives Work in Water Rinses

THREE rust preventive products have been developed for use in rinses.

Composition 15 is a liquid that can be added to hot or cold water rinses to prevent rusting of cast and malleable irons, sintered metals,



UNDERWOOD'S "IMPOSSIBLE" INSPECTION PROBLEM AND HOW IT WAS SOLVED

THESE INTRICATE PARTS go into the complex assembly at the top of the picture. This assembly masterminds Underwood Corporation's popular adding machine, *Add-Mate*.®

Precision is critical. Each odd-shaped part —whether machined, stamped, or formed— is different; yet *all* must meet close tolerances. One part, the carryover pawl arm (numbered), defied complete inspection by ordinary mechanical methods.

The stud diameter (1) and spread between stud and slot (2) of the pawl arm could be inspected using a go and no-go gage, at rates of 450 and 400 per hour respectively. For dimension (3)—stud angularity to 90° ± 1°—mechanical inspection was impractical.

Optical gaging provided a solution that was both accurate and practical. By using a Kodak Contour Projector, the inspection rate was increased by nearly 66% to 600 parts per hour—with all *three* dimensions accurately inspected.

Underwood relies on the Kodak Contour Projector, both in production and inspection, to assure adding machine accuracy. Stringent sample checks of parts help control production machine efficiency. And all finished parts receive 100% inspection.

If you have similar "impossible" inspection problems . . . if inspection for you seems to be taking too much time . . . or if accuracy isn't what you think it should be, an Optical Gaging Products* man can help you.

And when optical gaging will solve it, remember you get *more* with a Kodak Contour Projector.

You get ample, uniform working space—a constant 8" of clearance for parts and fixtures regardless of magnification.

You get brilliant, uniform illumination over the entire screen, at all magnifications.

You get highly accurate images even at the critical outer edges of the screen.

You get upright images of all inspected parts for easier reference.

These and other features of the Kodak instrument make it efficient and more valuable to you. Read about them by writing for the booklet *Kodak Contour Projectors*.

***Kodak Contour Projectors are distributed nationally by Optical Gaging Products, Inc.,** 26 Forbes Street, Rochester 11, N. Y.

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the KODAK CONTOUR PROJECTOR

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TRADEMARK

and steel during processing. Recommended proportions: 1 to 4 ounces of the composition to 1 gallon of water.

Composition DR is added to hot or cold water rinses to facilitate drying and to add corrosion resistance to steel surfaces. It can be used in tumbling barrels.

Composition DS is available for power washers.

For further information, *write* Mitchell-Bradford Chemical Co., Wampus Lane, Milford, Conn.

Dust Collector Uses Fiber Glass Filters to 550° F

A DUST COLLECTOR made by Pangborn Corp. handles air pollution problems created by high temperature fume and dust conditions. The unit uses glass filter fabric that permits efficient filtration at temperatures as high as 550° F.

Dust is collected on the inside surfaces of the filter tubes. For cleaning, a jet inside each tube provides short blasts of higher pressure air, alternating with a small amount of reverse air flow from the main fan. That partially collapses the tubes, cleans the filter surfaces, and deposits the residue in storage hoppers.

An adjustable electric program timer controls the unit. Typical uses include high temperature drying, foundry cupolas, metallurgical furnaces, carbon black recovery, and cement kilns.

For further information, *write* Pangborn Corp., Hagerstown, Md.

Portable Gravity Conveyor Extends up to 30 ft

THE Rapistan gravity conveyor can be extended from less than 11 up to 30 ft. It's portable and is mounted on 5 in. diameter casters. Each unit is a nesting set of three 18 in. gravity wheel conveyor sections designed for loading or unloading trucks. It can also be used for moving materials into stacking areas and in other warehousing applications.

When loading, the conveyor is extended into the truck, car, or bay. As loading progresses, the conveyor is telescoped gradually until fully compressed (if necessary). Rapistan Floor locks hold the unit rigidly in position while in use. The loading end can be raised from 34¼ to 41½ in. The unloading end is adjustable from 20¼ to 27¼ in. Each section has a built-in 2 in. pitch. For runs longer than 30 ft, a section or more of standard gravity conveyor can be added to either end.

For further information, *write* Rapids-Standard Co. Inc., 342 Rapistan Bldg., Grand Rapids 2, Mich.

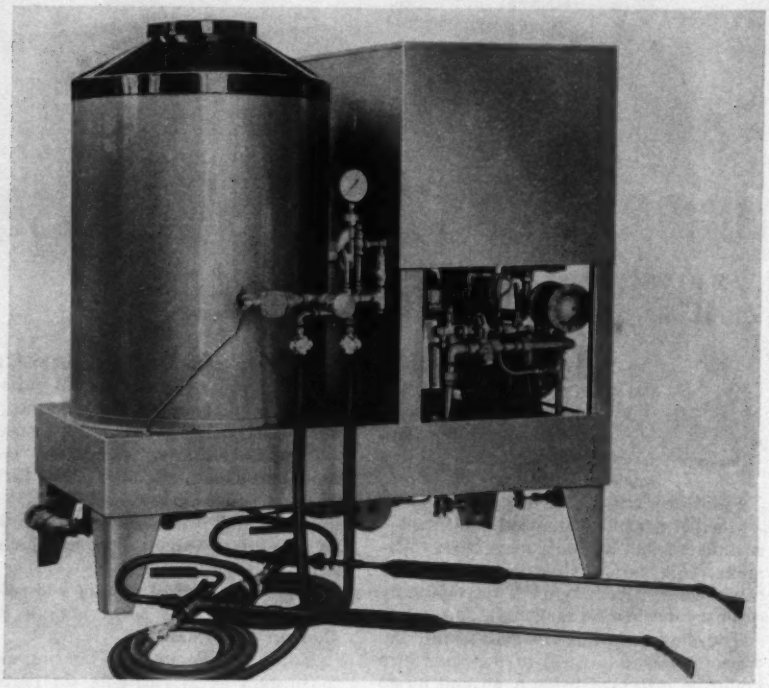
Solid Film Lubricant Can Be Brushed, Sprayed On

A SPECIALLY prepared formulation of molybdenum disulfide (Poxylube) is easily applied.

Usual methods of painting, such as spraying, brushing, or dipping, can be employed.

The dried film provides permanent lubrication for rotating and sliding bearing surfaces. Usually, simple degreasing is the only surface preparation necessary.

For further information, *write* Poly Chem, 541 S. Webster, Indianapolis 19, Ind.



Steam Cleaner Does Assembly Line Work

YOU CAN do assembly line cleaning and other steam cleaning requiring large volumes of hot solution with the Malsbary Model 330.

Cleaning solution is delivered at a rate of 330 gallons per hour at 60 to 90 psi through one or two nozzle-controlled guns. Operations can be carried out 100 to 200 ft away from the cleaner. Flow of solution at the gun nozzle is controlled by squeezing or releasing the gun handle. When two guns are used, either is controlled independently of the other.

The solution tank holds 60 gallons, enough for 4 hours of steady cleaning. The burner is adaptable to natural gas, butane, propane, or manufactured gas. The cleaner

Another example of National Roll quality control

Elmer Grinder, left, of National's steel foundry discusses chill location with Bill Williamson of the Sales Department.

Roll molds determine life, not just dimensions

Molding techniques for steel rolls are, of course, directed at obtaining a casting with accurate dimensions for economical machining into precise shaped or plain rolls.

But just as important as dimensions —determined by the "sweep" pattern shown above—is the metallurgical function built into every roll mold. Metal "chills" are carefully located to control cooling of the steel in a manner that will produce a roll both metallurgically and physically sound.

Started on paper, the chill layout is translated into a mold of metal and sand under the watchful attention of National's experienced steel foundry personnel. These men know foundry practice. But perhaps more importantly, they know the demands that are made on roll soundness in the customer's mill.

This is a part of National's service which means better rolls for you. It's one of the many reasons why . . .

National's the growing name in rolls

NATIONAL ROLL & FOUNDRY DIVISION

GENERAL STEEL CASTINGS CORPORATION, Avonmore (Westmoreland County), Pa.

General Steel Castings Corporation, General Offices: Granite City, Illinois • Plants: Granite City, Ill., Eddystone, Pa., Avonmore, Pa.

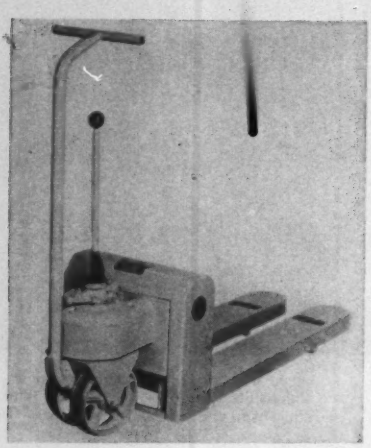
measures only 63 x 62 x 36 in. wide and weighs 1200 lb.

For further information, *write* Malsbary Mfg. Co., 845 92nd Ave., Oakland 3, Calif.

Lightweight Pallet Truck Handles Up to 4000 lb

A SINGLE faced, pallet lift truck is useful for short haul operations and in crowded areas. Capacities range from 2500 to 4000 lb. The unit weighs 225 lb.

It has a 5¼ ft raised fork height under clearance. The rear surface on the 2500 lb capacity model has

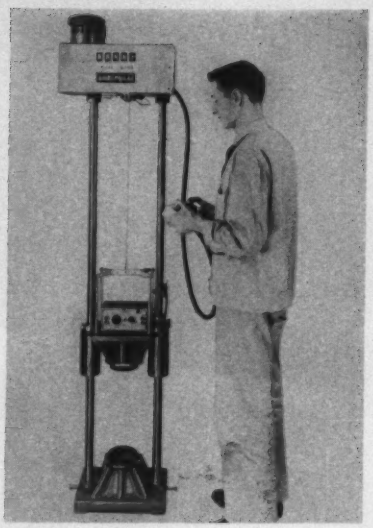


a 25 per cent wider load bearing capacity. It's 50 per cent more on the 4000 lb model. Fork lengths in both capacities run from 24 to 48 in. (in 6 in. increments).

For further information, *write* Colson Corp., 7 S. Dearborn St., Chicago, Ill.

Shock Machine Handles Production Testing

THE 16750 Varipulse shock machine can do production and laboratory testing of small electronic, electromechanical, and mechanical components. It accommodates test specimens weighing up to 20 lb and occupying an 8 in. cube. It provides accurate and repeatable half-sine, sawtooth, and square waves. The gravity, free fall principle is used for simplicity, economy of op-



eration, and minimum maintenance. A remote pushbutton control and a disconnect interlock provide safety features for the operator.

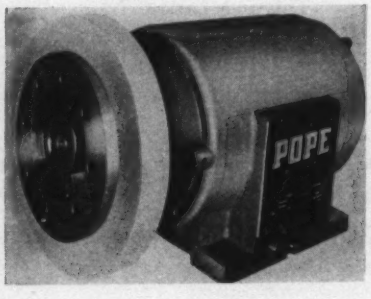
The machine requires a 110 volt power source (no gas or hydraulics are involved). A special foundation is not needed. Operation for any of the specified shock pulses can be manual or automatic.

For further information, *write* Barry Controls Inc., 700 Pleasant St., Watertown, Mass.

Precision Motors in NEMA Sizes Rated 1 to 20 hp

PRECISION, custom-built motors in NEMA frame sizes in a new line are dynamically balanced to 0.000025 amplitude of vibration. Maximum shaft runout is 0.000050 in.

They're available from 1 to 20 hp with speeds from 900 to 3600 rpm (with straight or tapered noses). Permanently preloaded double row cylindrical roller bearings with tapered bores are mounted at the shaft extension end of the



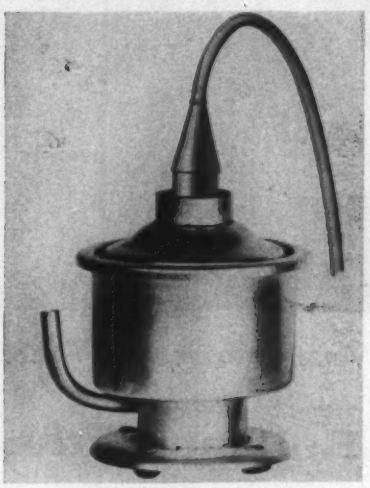
casting that forms the motor housing and base. The rear housing for the bearings places permanently preloaded, angular contact bearings close to the rotor.

For further information, *write* Pope Machinery Corp., 261 River St., Haverhill, Mass.

Submerged Pumps Move Up To 514 Gallons per Hour

SMALL BRASS PUMPS that can be submerged in materials such as lubricants, photographic solutions, and machine tool coolants are available.

Applications include pumping coolants on stone and metal cutting saws, and in water circulating systems of icemaking machines. Pump housings and covers are made



from Western Yellow Brass Alloy No. 30. Capacities of the fractional horsepower electric units range from 200 to 514 gallons per hour.

For further information, *write* Thomas Beckett & Co. Inc., P. O. Box 13245, Dallas 20, Tex.

Pendant Switch Keeps Out Oil, Acids, Water, Dirt

A TWO BUTTON model of the Joy pendant switch can now be obtained. Each button is integral with the housing (molded two piece Hycar). The switch is impervious to oil or acids, and effectively excludes water, dust, and grime.

Precision snap action permits use

on circuits up to 460 volts, 20 amperes.

For further information, *write* Electrical Products Div., Joy Mfg. Co., 1201 Mackland Ave., St. Louis 10, Mo.

Lathe Has Full 60 hp In All Speed Ranges

THREE MODELS of the Sidney 3220 lathe are available. You can get swings over the bed of 32½, 35½, and 38¼ in. Swings over the compound range from 20½ to 28½ in. The lathe has antifriction bearings, automatic lubrication, and a 60 hp drive (no speedup gearing). All gears are hardened and ground or shaved.

Maximum metal removal rate is 145 cu in. per minute. The headstock has 36 spindle speeds in true geometric progression, cutting speeds automatically calculated through a single dial control, and an over-all speed ratio of 160:1. A full 60 hp is delivered in all speed ranges. Optional accessory equipment is available.

For further information, *write* Sidney Machine Tool Co., a subsidiary of Buhr Machine Tool Co., 1940 Carey St., Sidney, Ohio.

Oil Resistant Adhesive Has Elastomeric Base

A HIGH strength, oil resistant adhesive (elastomeric base) can bond a wide variety of porous and nonporous materials. The bonds are reported to have high softening points and excellent resistance to plastic flow. The material is suited for volume production or it can be hand sprayed or brushed.

The adhesive produces high strength laminates with materials such as plastic, thin gage aluminum and steel, porcelain enameled steel, linoleum, leather, and wood.

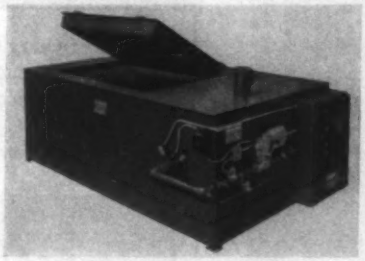
Shear strengths of wood to steel bonds are in the 400 psi range. Aluminum to plywood bonds have tensile shear strengths of 400 psi immediately after cooling from the cure temperature. Peel strengths are 30 to 40 lb per in. of width after aging four days at room temperature.

For further information, *write* Minnesota Mining & Mfg. Co., 900 Bush Ave., St. Paul 6, Minn.

Top Loading Oven Works to 950° F

YOU can do preheating, stress relieving, aging, air drawing, and solution heat treating (up to 950° F) with a top loading oven made by Young Bros. Co.

The model shown has a working space 3½ ft wide, 5 ft long, and 1½ ft deep. The heavy duty floor grille is designed for a 5000 lb load. The design has a high air recirculating



rate, automatic temperature controls, and electronic combustion safeguards. It's available in gas fired or electrically heated models. It's shipped assembled and ready to operate.

For further information, *write* Young Bros. Co., 1831 Columbus Rd., Cleveland 13, Ohio.

NEW Literature

Write directly to the company for a copy

Electrode Pocket Guide

A 64 page booklet, ADC 650, contains information on all types of available Airco electrodes, including mild steel, low alloy, low hydrogen, iron powder, stainless steel, hard-facing, nonferrous and cast iron. Air Reduction Sales Co. a division of Air Reduction Co. Inc., 150 E. 42nd St., New York 17, N. Y.

Industrial Pumps

A 16 page booklet, listing a variety of pumps, gives types, applications, and specifications. Ruthman Machinery Co., 1809 Reading Rd., Cincinnati 2, Ohio.

Blast Cleaning Barrels

Bulletin No. 706 describes the standard duty line of Rotoblast cleaning barrels from 1½ to 18 cu ft capacity. Pangborn Corp., Hagerstown, Md.

High Pressure Pneumatics

Catalog 125 provides performance and engineering data on central compression systems supplying air, nitrogen, helium, or other gases for high pressure pneumatic applications. High Pressure Pneumatics Div., Airdox Cardox Products Co., 307 N. Michigan Ave., Chicago 1, Ill.

Welding Applications

"Resistance Welding at Work," a 16 page bulletin, is the fifth of a series which describes a variety of resistance welding case histories. Dept. L-27, Sciaky Bros. Inc., 4915 W. 67th St., Chicago, Ill.

Tubing Catalog

A 28 page bulletin lists sizes and grades of stainless and carbon steel pipe, tubing and fittings, including aircraft and missile tubing. A. B. Murray Co. Inc., P.O. Box 476, Elizabeth B, N. J.

Mill Roll Grinding

A 20 page handbook, RG-59, gives the correct procedure for grinding the body of mill rolls. Landis Tool Co., Waynesboro, Pa.

Temperature Control Data

"Temperature Control of Heat Treating Furnaces," GER-1206, a 24 page booklet, discusses thermocouples, control instruments, control elements, control systems, and special systems. All phases of temperature control listing definitions, basic types, and how to select the proper item are covered. General Electric Co., Schenectady 5, N. Y.

Variable Speed Belts

A 32 page belt selection guide gives ratings, sizes, and engineering data for variable speed belt users. Service Div., Maurey Mfg. Corp., 2907 S. Wabash Ave., Chicago 16, Ill.

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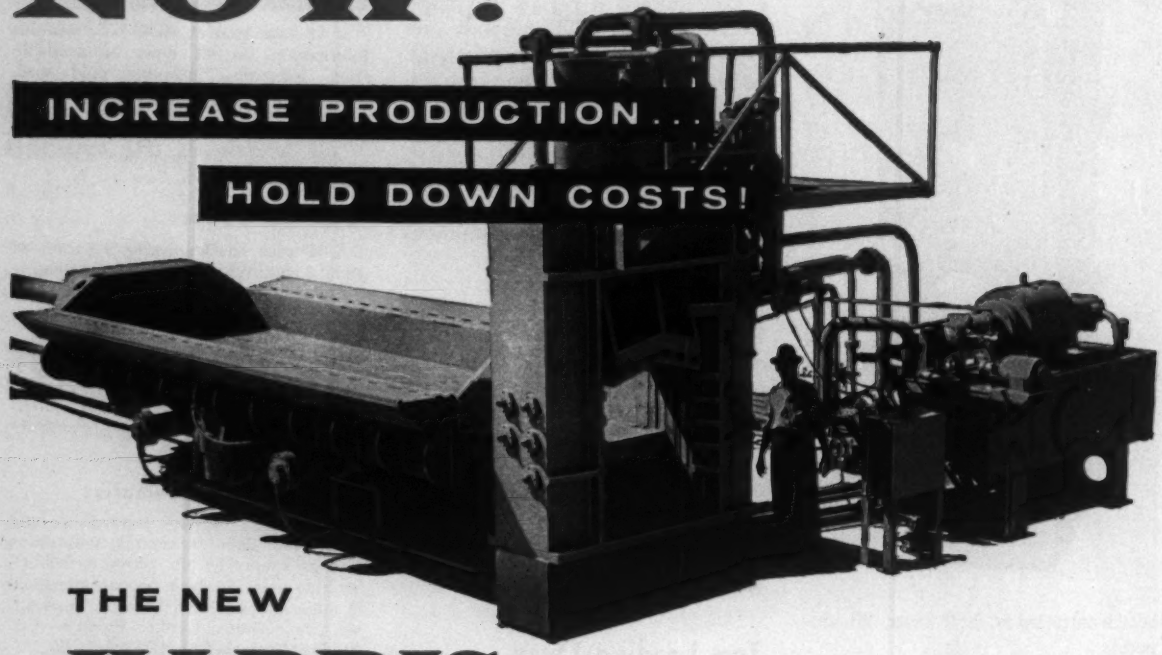
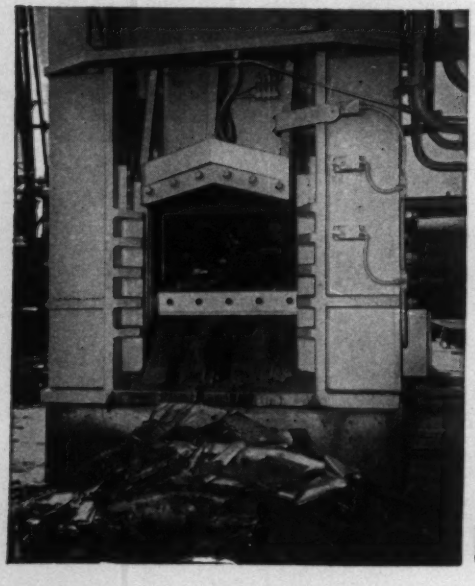


THE NEW

HARRIS BS-350 BALER-SHEAR

AUTO FRAMES and bulky scrap work through easily. The Harris Baler-Shear was designed to eliminate problems arising from the preparation of bulky scrap. It incorporates the principles of baling and shearing.



SPECIFICATIONS

size of charging box	264 x 83 x 41"
shear opening height	20"
shear opening width	36"
shear force	350 tons
floor space required	55' x 20'

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CORDELE, GEORGIA

Talk with a Man from Harris

Pressure Eases as Stocks Mount

SHIPMENTS of finished steel are running about 25 per cent ahead of consumption, allowing users to rebuild their strike depleted inventories at a rapid rate.

You can expect mill shipments of about 8.5 million tons this month, consumption of 6.8 million, and an addition of 1.7 million tons to users' stocks. Next month, the pattern will be repeated. In March, consumption may jump to 7.4 million tons as automakers strive to reach their first quarter production goals and better weather stimulates building activity. But even then, receipts from mills will be more than 1 million tons larger than consumption. Result: A first quarter buildup of 4.5 million to 5 million tons.

DEMAND LESS URGENT— With stockpiles mounting and strike fears laid to rest, users aren't pushing so hard for quick deliveries. Normal leadtimes have been restored in many product areas (standard structurals, merchant wire, rails, stainless steel), and it's apparent that plates, bars, and tubular items are easing.

SPOTLIGHT ON SHEETS— In spite of the improved supply situation, cutbacks are few and cancellations almost nil. Demand for sheets and tin plate is nearly as strong as it was before the strike settlement. Users expect a tight market through June, but they are concentrating on getting first quarter deliveries. Although users are convinced that flat rolled products will be in strong demand for months, some are trying to pick up extra first quarter tonnage by telling their suppliers that a second quarter dropoff is inevitable. They're urging the suppliers to get all the business they can while they can.

CONVERSIONS TO END— Automakers are still pressing for all the sheets they can get, but they'll probably wind up their conversion deals by April. It's understood that shipments are far behind schedule and that it's no longer economical or necessary to continue them. The carbuilders will have to hustle if they're going to assemble a record 2.25 million cars in the first quarter. They'll turn out about 700,000 in January, leaving themselves the formidable task of assembling 775,000 in February and a like number in March. The best they've ever done was 794,188 (in March, 1955).

FOREIGN STEEL PRICES CUT— Determined to keep the American accounts they picked up during the strike, steelmakers in western continental Europe have cut the price of hot rolled sheets by $40 a ton. Cold rolled and galvanized sheets have been reduced by $26. Furring channels are off $20 and basic bessemer plates, $7.40.

FERROMANGANESE DROPS— In a related development, E. J. Lavino & Co. reduced its base price on standard (76 per cent) ferromanganese from $245 a net ton, Sheridan, Pa., to $220. Lower ore prices in effect since 1958 apparently made the move possible. Although the reduction narrows the gap between domestic and foreign ferromanganese prices, the difference is still substantial. French producers have been quoting $150 to $155 a ton, delivered to Pittsburgh.

PRODUCTION STEADY— Last week, steelmakers operated their furnaces at 95.5 per cent of capacity, off 0.2 point from the previous week's revised rate. Output: About 2,721,000 ingot tons.

WHERE TO FIND MARKETS & PRICES

	News	Prices		News	Prices
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*Current prices were published in the Jan. 18 issue and will appear in subsequent issues.

Demand for Galvanized Products Mounts

AN ESTIMATED 527,430 tons of zinc will be channeled into the production of a record 6,323,329 net tons of galvanized iron and steel products this year. The previous high was in 1955, when galvanizers used 429,697 tons.

Of every 15 tons of finished steel produced in 1960, about 1 ton will be galvanized. Output of galvanized sheets (estimated at 3.75 million tons) will require about 279,105 tons of zinc, a record. Leading in sheet consumption will be contractors' products and construction, accounting for 1.56 million tons. Nearly 1.2 million tons of galvanized sheets will move through the steel service centers.

• Largest increase in consumption of galvanized sheets this year will be by the automobile industry.

Unitized bodies take substantially more galvanized steel than other types—mostly sheets for the rustproofing of exposed underframes. Ford's Falcon uses 85 lb, and other Ford models take twice that amount.

With at least 1 million more automobiles likely to be assembled this year than in 1959, consumption of galvanized products by the automobile industry may nearly triple last year's total. As recently as 1958, the average auto required 63 lb of galvanized sheets and strip, an increase of more than 700 per cent over the 8.9 lb used in 1954. While auto sales declined 26 per cent from the 1957 total, shipments of zinc coated sheets were 7 per cent heavier.

Use of galvanized steel has mounted sharply since 1958, and 1960 should see further gains. Chevrolet and other carbuilders are expected to use more coated sheets. Many cars will have undersides entirely protected by galvanized steel.

• Sheets and strip consumed the largest tonnage of zinc in galvanizing, but other coated steel products use somewhat heavier zinc coatings.

For example, 1 ton of zinc is used to galvanize 11.5 tons of pipe, while 1 ton of zinc coats slightly under 15 tons of sheets. Some wire products take a lighter coating than sheets.

Electrolytic coated sheets will total around 300,000 tons this year. The balance of zinc coated sheet output will be mostly hot dipped by the continuous process. More than half of the steel galvanized this year will be sheets, with production exceeding last year's by more than 1 million tons.

This year's volume will crowd the capacity of our continuous galvanizing lines (3 million tons). It's estimated that demand will total around 4.5 million tons by 1965. To meet the increased load, additional equipment is being installed. We have more than 225 galvanizers.

• The trend is toward the galvanizing of heavier fabricated work—bridges, weldments, and large fasteners.

Larger baths and higher productive capacity are factors in meeting the trend toward hot dip galvanizing in heavier construction.

An increasing tonnage of hot dip galvanized highway guard rails (coated after fabrication and erected with galvanized bolts) is being installed. Other highway steel products (galvanized after fabrication) include: Decking, grating, fence posts, sign and reflector supports, expansion plates, lighting standards, and rocker plates.

Galvanizing may well account for nearly 47 per cent of slab zinc consumption. Pipe (iron and steel) will experience a peak year. Most galvanized pipe is buttwelded. About 25 per cent of the galvanized sheets to be produced this year will be corrugated and of heavier gage and

Production of Galvanized Products

(Iron and Steel, net tons)

	1960*	1959*	1958	1955
Sheets	3,758,000	2,674,000	2,864,615	2,875,058
Pipe, Tubes	1,110,002	665,167	753,973	1,100,690
Wire Products	598,102	492,150	595,200	674,000
Other	857,225	801,102	847,115	838,921
Totals	6,323,329	4,632,419	5,060,903	5,488,669

Slab Zinc Consumption for Galvanizing

(Net tons)

	1960*	1959*	1958	1955
Sheets	279,105	174,161	194,196	194,205
Pipe, Tubes	121,005	58,587	67,318	120,115
Wire Products	42,105	39,323	35,638	41,527
Other	85,215	75,100	84,077	83,850
All Galvanizing	527,430	347,171	381,229	439,697

*Estimated, STEEL.

will require more zinc coating. Federal highway demands for asphalt coated, corrugated, galvanized pipe for drainage are mounting, and corrugated sheet output will total around 855,000 tons. The volume of castings to be galvanized this year will increase about 10 per cent.

• Most users of galvanized steel products anticipate an increase in prices.

Normally, product prices fluctuate with changes in zinc costs, but higher base prices are expected this year, to reflect the new steel labor contract. Labor costs are higher in the production of galvanized products than in most finished steel products. Consumers think galvanized prices will go up more than $5 a ton.

Inventories of galvanized sheets and other products are low. If steel is available, galvanizers expect to operate near capacity during most of the year, notably on flat rolled products.

The adverse ratio between exports and imports will continue, being most serious in galvanized wire products, chiefly nails and fencing. Exports of galvanized sheets have been halved the last two years. While nails and galvanized merchant wire products are likely to show gains over 1958-59, they will not maintain the general market pace. Consumption will be heavy, but imports of nails, fencing, barbed wire, and other coated wire products will continue to make deep dents in domestic production.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 97 & 98

Sheet consumers are pressing for earliest possible deliveries. Primarily, they're concerned about the first quarter. A frequently heard argument goes: "You had better ship us as much as you can during the first quarter because things won't always be so good. Business is bound to slough off after March."

Sheetmakers are convinced business will continue excellent through June. They have received few order cancellations since the steel labor agreement was reached, and they feel they won't be in position to accept any additional second quarter delivery business unless customers change their minds and

Here he is folks . . . *Chief Keokuk*, favorite son of steel men and foundry-men everywhere, and he wants *your* vote! His platform: Kemco Silvery . . . *the superior form of silicon introduction.* He promises: Uniformity and Economy. When you think of silicon, *think* . . . and vote for Kemco!*

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release tonnage orders already on mill books.

Indications are that sheets will be in balanced supply by the second quarter, but still the market is expected to remain tight. Allocations will probably be liberalized after June, but some makers believe they'll have to keep quotas on cold rolled and galvanized for the balance of the year. So far, books haven't been opened for third quarter orders.

Steel Bars . . .

Bar Prices, Page 96

Some hot carbon bar orders have been cut back, but there have been few outright cancellations. Generally, the mills are restricting bookings to the normal buying pattern of their regular customers.

There has not been enough tonnage involved in cutbacks to affect mill schedules. In fact, gaps are filled almost as quickly as they appear. Over-all, producers are booked into May on hot carbon bars, and into April on hot alloy bars, except where heat treatment is involved.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 97

Imports are hurting the reinforcing steel market at some points. Higher domestic prices are difficult to maintain in competition with lower priced foreign material. The disadvantage is notably pronounced in the South, where one leading distributor recently withdrew from the Florida market.

In New England, a district supplier is meeting demand with foreign bars. The market in the area is under price pressure with demand turning upward, mostly for steel for bridges and schools.

Prices on Imported Steel Products Taking a Dive

In the wake of the steel labor settlement, prices on imported steel from Western Europe are declining. The most pronounced drop is in sheets, hot rolled being off $40 a ton, and cold rolled and galvanized $26. Furring channels are down $20 and basic bessemer plates $7.40.

Other declines are relatively modest, ranging from $2 to $4 a ton. Exceptions to the downtrend are merchant bars, which are higher, and wire rods (both Thomas commercial No. 5 and open hearth), which are unchanged. For the new list of prices on imported steel, see Page 102.

In anticipation of the opening of the Great Lakes navigation season this spring, European importers are beginning to quote delivery prices for lake ports again, this time at levels $20 a ton higher than those at North Atlantic ports.

With pressure off because of the steel strike settlement, import bookings are slower and deliveries have eased considerably. Shipments of merchant products from Western European mills, including sheets, now range around two months. Exceptions are primarily in tubular goods, with seamless and cold drawn tubing not available much under four to five months.

Reflecting the general easing, the first price break on foreign steel

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since the strike settlement was reported last week at Houston. A French mill made reductions ranging from 13 to 32 cents a hundred pounds on a wide range of items for delivery within three to four months.

The mill quoted angles at $5.88, off 13 cents; comparable domestic price is $6.80. French reinforcing bars were reduced 15 cents a hundred pounds, rounds and squares 15 cents, structurals 18 cents, and H-beams 25 to 32 cents.

Plates . . .

Plate Prices, Page 96

Consumers are still pushing for plate tonnage to be delivered through April, but they're not showing too much interest beyond that month. For the most part, platemakers feel there will be enough business to keep them busy through the first half. Some of them, in fact, are booked up pretty well through May on sheared plates, with the heavier gages in strongest demand.

Tubular Goods . . .

Tubular Goods Prices, Page 100

Rotary drilling operations for the week ended Jan. 11 fell to the lowest level in more than 12 years, a Hughes Tool Co. survey shows. With 1673 rigs at work in the U. S., the count was the lowest since the May-June period of 1947. Compared with the week of Jan. 4, the rig count was down 180.

Stainless Steel . . .

Stainless Steel Prices, Page 100

While optimistic about business prospects for 1960, stainless steel producers report current sales are slow. Much of the December and early January tonnage went out of the mills under forced draft, users taking in everything offered them as they feared resumption of the steel strike. Result: Some mills now won't close their February order books until the middle of the month. With the strike threat removed, consumers' inventories appear to be in pretty fair shape, which accounts for the sluggish buying.

Stainless steel shipments averaged 22,000 tons monthly in August, September, and October vs. 83,749 tons in June and 48,819 tons in November.

Tin Plate . . .

Tin Plate Prices, Page 98

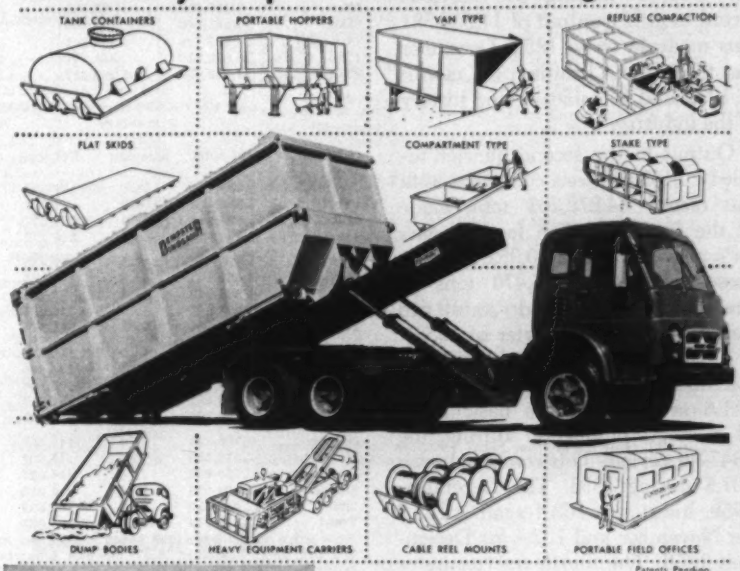
Removal of the strike threat brought little relief to tin plate producers. They're under heavy pressure from customers for shipments. One Pittsburgh area producer reports: Not a single customer wants to cancel tonnage or delay shipments.

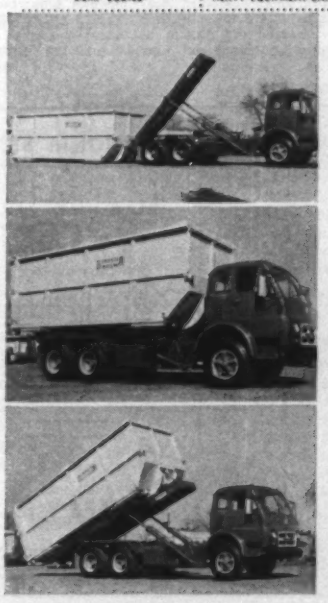
Producers are sold out through June and haven't opened their books for the third quarter.

With production at a high level, canmakers are ordering the specifications they need. During the inventory accumulation period last year, they took delivery of everything the mills could provide. Today, inventories are unbalanced, and the move is toward rounding them out.

Speaking at the National Canners Association convention in Miami, Roger M. Blough, chairman, U. S. Steel Corp., disclosed that his company is working on a new tin plate

One DINOSAUR With Detachable Containers . . . . Solves Many Complex Materials Handling Problems





Here's the materials handling tool that takes up where the fork-lift truck leaves off. Gigantic loads can be placed on skids, in tanks or containers. The DEMPSTER-DINOSAUR picks them up . . . automatically . . . in seconds . . . and whisks them to their destination, in-plant or to over-the-road locations. Here they are put down, intact . . . pushed off on a dock . . . left on telescopic legs . . . or dumped.

One truck handles any number of containers of many types. Value of truck is multiplied . . . standing-idle time is eliminated . . . loading and handling is cut to the minimum. One man, the driver, handles the all-hydraulic operations without leaving the cab.

Containers available up to 40 cu. yds. and over . . . loads are limited only by the capacity of the truck. If you have a special problem send it in.

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which may be "lighter, thinner, and stronger than any you have ever used."

Steel Output in December Establishes All-Time High

Production of ingots and steel for castings increased 8,181,928 tons last year to 93,436,813 tons from 85,254,885 tons in 1958. The total was seventh highest on record, says the American Iron & Steel Institute in a preliminary report. The gain over 1958 was made despite the longest strike in the industry's history.

December output totaled 11,980,000 tons, surpassing the previous record monthly output of 11,600,581 tons made in May, 1959. December was the fourth 11 million ton month of 1959 and the sixth in the history of the industry.

Output in the second quarter totaled 29,158,610 tons compared with the record 64,278,203 tons made in the first half. The fourth quarter's production was 20,952,140 tons compared with 8,206,470 tons in the third quarter and 26,119,618 tons in the fourth quarter of 1958.

Based on the institute's index of steelmaking, 1959 production was 111.6 in terms of the basic index of average production during the 1947-49 period. This compared with 101.8 during 1958. The December, 1959, index was 168.4 against 105.6 for November and 122.4 for December, 1958. The fourth quarter index was 99.2 against 38.9 in the third quarter of 1959 and 123.7 during the fourth quarter of 1958.

Based on the Jan. 1, 1959, capacity rating of 147,633,670 tons, steelmaking facilities were utilized at an average of 63.3 per cent of capacity during 1959.

Steel Ingot Production—December, 1959

Period	OPEN HEARTH (Net tons)	BESSEMER (Net tons)	OXYGEN PROCESS (Net tons)	ELECTRIC (Net tons)	TOTAL (Net tons)	Percentage of capacity
1959						
January ...	8,280,985	120,005	186,820	729,575	9,317,385	74.3
February ..	8,541,031	128,515	176,970	756,422	9,602,938	84.8
March	10,216,474	184,892	236,595	929,784	11,567,745	92.3
1st Qtr. ...	27,038,490	433,412	600,385	2,415,781	30,488,068	83.8
April	9,884,322	195,730	237,018	964,850	11,281,920	93.0
May	10,117,968	200,887	257,325	1,024,401	11,600,581	92.5
June	9,521,053	185,794	259,731	941,056	10,907,634	89.9
2nd Qtr. ...	29,523,343	582,411	754,074	2,930,307	33,790,135	91.8
1st 6 Mo. ..	56,561,833	1,015,823	1,354,459	5,346,088	64,278,203	87.8
*July	4,541,741	66,433	98,634	525,368	5,232,176	41.7
August	1,171,342	.....	.....	267,935	1,439,277	11.5
September .	1,249,398	.....	.....	285,619	1,535,017	12.7
*3rd Qtr. ..	6,962,481	66,433	98,634	1,078,922	8,206,470	22.1
*9 Mo.	63,524,314	1,082,256	1,453,093	6,425,010	72,484,673	65.6
Oct.	1,385,490	.....	.....	319,043	1,704,533	13.6
*Nov.	6,290,659	92,361	129,794	754,793	7,267,607	59.9
†Dec.	10,461,000	206,000	281,000	1,032,000	11,980,000	95.5
†4th Qtr. ..	18,137,149	298,361	410,794	2,105,836	20,952,140	56.3
†2nd 6 Mo..	25,099,630	364,794	509,428	3,184,758	29,158,610	39.2
†Total	81,661,463	1,380,617	1,863,887	8,530,846	93,436,813	63.3

Period	—OPEN HEARTH— Net tons	Percentage of capacity	—BESSEMER— Net tons	Percentage of capacity	—ELECTRIC— Net tons	Percentage of capacity	—TOTAL— Net tons	Percentage of capacity
1958								
January ..	6,085,124	58.6	121,338	35.5	547,440	44.8	6,753,912	56.5
February .	5,252,112	56.0	81,597	26.4	448,614	40.6	5,782,323	53.6
March	5,598,944	53.9	122,317	35.8	533,361	43.6	6,254,622	52.3
1st Qtr. ..	16,936,180	56.2	325,252	32.8	1,529,425	43.1	18,790,857	54.1
April	4,875,619	48.5	109,433	33.1	547,939	46.3	5,532,991	47.8
May	5,602,123	53.9	110,366	32.3	588,670	48.2	6,301,159	52.7
June	6,378,942	63.4	88,125	26.6	660,413	55.8	7,127,480	61.6
2nd Qtr. ..	16,856,684	55.3	307,924	30.7	1,797,022	50.1	18,961,630	54.0
1st 6 Mo..	33,792,864	55.7	633,176	31.7	3,326,447	46.6	37,752,487	54.1
July	5,712,587	55.0	114,218	33.4	615,600	50.4	6,442,405	53.9
August ...	6,481,185	62.4	134,435	39.3	692,383	56.6	7,308,003	61.1
September .	6,769,660	67.3	103,194	31.2	759,518	64.2	7,632,372	66.0
3rd Qtr. ..	18,963,432	61.5	351,847	34.7	2,067,501	57.0	21,382,780	60.3
9 Mo.	52,756,296	57.7	985,023	32.7	5,393,948	50.1	59,135,267	56.2
October ..	7,795,541	75.0	148,458	43.4	895,779	73.3	8,839,778	74.0
November .	7,572,555	75.3	145,867	44.1	850,896	71.9	8,596,318	74.1
December .	7,755,002	74.6	116,637	34.1	838,883	68.6	8,710,522	72.9
4th Qtr. ..	23,123,098	75.0	410,962	40.5	2,585,558	71.3	26,119,618	73.6
2nd 6 Mo..	42,086,530	68.3	762,809	37.6	4,653,059	64.1	47,502,398	67.0
Total	75,879,394	62.0	1,395,985	34.7	7,979,506	55.4	85,254,885	60.6

Note—The percentages are based on annual capacities as of Jan. 1, 1959: Open hearth, 126,528,380 net tons; bessemer, 3,577,000 net tons; basic oxygen process, 4,033,160 net tons; electric and crucible, 13,495,130 net tons. Total: 147,633,670 net tons. In 1958, the capacity tonnages were: Open hearth, 122,321,830 net tons; bessemer, 4,027,000 net tons; oxygen process, electric, and crucible, 14,393,740 net tons. Total: 140,742,570 net tons.

*Revised. †Preliminary.

DISTRICT INGOT RATES

(Percentage of capacity engaged)

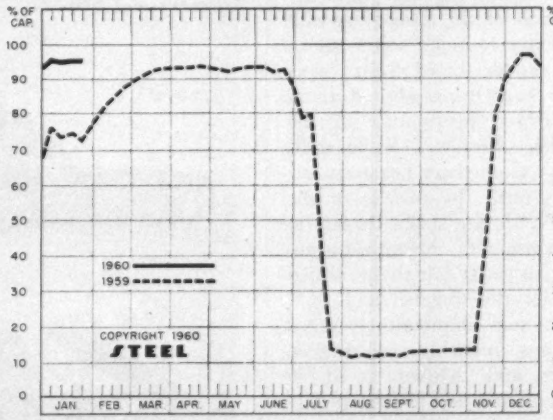
	Week Ended Jan. 24	Change	Same Week 1959	Same Week 1958
Pittsburgh	97	+ 0.5*	70	58
Chicago	95.5	— 1*	81.5	58.5
Eastern	96	+ 0.5	75	74
Youngstown	99	0	65	55
Wheeling	92	— 3	81	56.5
Cleveland	99	+ 2*	79	44
Buffalo 105		0*	71	53.5
Birmingham	93.5	0	70.5	55.5
Cincinnati	98.5	— 2.5*	80	56.5
St. Louis 100		0*	85.5	69.5
Detroit 103		— 2*	95	51
Western	94	+ 2	82	75
National Rate ..	95.5	— 0.2*	72.6	55.4

INGOT PRODUCTION

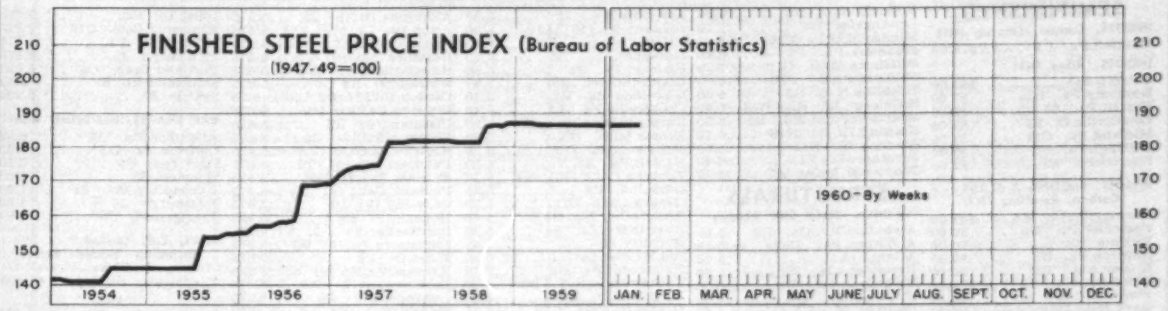
	Week Ended Jan. 24	Week Ago	Month Ago	Year Ago
INDEX ..... (1947-49=100)	169.4†	169.8	164.4	128.0
NET TONS ... (In thousands)	2,721†	2,727	2,641	2,056

*Change from preceding week's revised rate.
†Estimated by STEEL; comparative figures reported by AISI.
Weekly capacity (net tons): 2,849,474 in 1960; 2,831,331 in 1959; 2,699,173 in 1958.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Jan. 19, 1960	Week Ago	Month Ago	Dec. Index	Year Ago
186.8	186.8	186.8	186.8	187.0

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Jan. 19

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, Reinforcing	6.385
Rails, Light, 40 lb	7.292	Bars, C.F., Carbon	10.710
Tie Plates	6.875	Bars, C.F., Alloy	14.125
Axles, Railway	10.175	Bars, C.F., Stainless, 302 (lb)	0.570
Wheels, Freight Car, 33 in. (per wheel)	62.000	Sheets, H.R., Carbon	6.350
Plates, Carbon	6.350	Sheets, C.R., Carbon	7.300
Structural Shapes	6.167	Sheets, Galvanized	8.765
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, C.R., Stainless, 302 (lb)	0.658
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Strip, C.R., Carbon	9.489
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Stainless, 430 (lb)	0.480
Bars, H.R., Alloy	10.775	Strip, H.R., Carbon	6.250
Bars, H.R., Stainless, 303 (lb)	0.543	Pipe, Black, Buttweld (100 ft)	19.905
Bars, H.R., Carbon	6.675	Pipe, Galv., Buttweld (100 ft)	23.585
		Pipe, Line (100 ft)	199.533
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	27.005
		Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless, 430 (lb)	0.685
		Bale Ties (bundles)	7.967
		Nails, Wire, 8d Common	9.825
		Wire, Barbed (80-rod spool)	8.758
		Woven Wire Fence (20-rod roll)	21.793

STEEL's FINISHED PRICE INDEX*

	Jan. 20 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	194.53
Index in cents per lb	6.713	6.713	6.713	6.713	5.270

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$117.82
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	42.33	41.67	41.33	40.67	35.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	Jan. 20 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.30
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.30
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.975	4.55
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.40
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.25
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.25
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.77	4.53
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.225
Plates, Chicago	5.30	5.30	5.30	5.30	4.225
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.225
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.225
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.225
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.10
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.45
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	5.75
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	5.85
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	5.90
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	5.75
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.85
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.05

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$78.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	6.40	6.40	6.40	6.40	4.675

PIG IRON, Gross Ton

	Jan. 20 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	59.66
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	55.16
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry (Birm.) deld., Cin.	70.20	70.20	70.20	70.20	60.58
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	190.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$42.50	$42.50	$41.50	$43.50	$36.50
No. 1 Heavy Melt, E. Pa.	42.00	42.00	42.00	36.00	33.50
No. 1 Heavy Melt, Chicago	42.50	40.50	40.50	42.50	35.00
No. 1 Heavy Melt, Valley	44.50	44.50	43.50	43.50	36.50
No. 1 Heavy Melt, Cleve.	41.50	41.50	40.50	40.50	33.50
No. 1 Heavy Melt, Buffalo	37.50	37.50	37.50	35.50	30.50
Rails, Rerolling, Chicago	62.50	62.50	61.50	62.50	53.00
No. 1 Cast, Chicago	55.50	54.50	54.50	47.50	40.00

COKE, Net Ton

Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.25	$13.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	30.50	25.25

Steel Prices

Mill prices as reported to STEEL, Jan. 20, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 97; footnotes, page 99.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 .....$76.00

INGOTS, Alloy (NT)

Detroit S41 .....$82.00
Economy,Pa. B14 .....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)

Bartonville,Ill. K4 ...$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 .....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B2 .....80.00
Lackawanna,N.Y. B2 .80.00
Munhall,Pa. U5 .....80.00
Owensboro,Ky. G8 ...80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ...80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)

Bessemer,Pa. U5 .....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa. A3 .104.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 .....99.50
Farrell,Pa. S3 .....99.50
Fontana,Calif. K1 ...109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 .....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 .....99.50
Lackawanna,N.Y. B2..99.50
LosAngeles B3 .....109.00
Midland,Pa. C18 .....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 .....109.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14 99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ...109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)

Bethlehem,Pa. B2 ...$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 .....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3..126.00
Detroit S41 .....119.00
Economy,Pa. B14 .....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ...140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ...119.00
Johnstown,Pa. B2 .....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 .....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 .....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky. G8 ....119.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14 119.00
S.Duquesne,Pa. U5 ...119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2, W14 122.50
S.Duquesne,Pa. U5 ...122.50
Warren,O. C17 .....122.50

SKELP

Aliquippa,Pa. J5 .....5.05
Munhall,Pa. U5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS

AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 .....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1..6.40
Johnstown,Pa. B2 .....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 .....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 .....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 .....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes

AlabamaCity,Ala. R2 ..5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 .....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 .....6.25
Seattle B3 .....6.25
S.Chicago,Ill. U5, W14..5.50
S.SanFrancisco B3 .....6.15
Sterling,Ill. N15 .....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange

Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 .....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N15 .....5.50
Weirton,W.Va. W16 ....5.50

Alloy Std. Shapes

Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes

Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1..8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 .....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Seattle B3 .....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 .....8.70
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....8.05

H.S., L.A., Wide Flange

Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05
Sterling,Ill. N15 .....7.75

PILING

BEARING PILES

Bethlehem,Pa. B2 .....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 .....6.50
S.Chicago,Ill. I-2, U5 ..6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel

AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10 ...5.30
Atlanta A11 .....5.50
Bessemer,Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. C22 .....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 .....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg,Pa. P4 .....5.30
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1..5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B3 .....6.20
Sharon,Pa. S3 .....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 .....7.05
Fontana,Calif. K1 .....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 .....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron

Economy,Pa. B14 .....13.55

PLATES, H.S., L.A.

Aliquippa,Pa. J5 .....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont, Del. C22 ....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 .....7.95
Conshohocken,Pa. A3 ...7.95
Economy,Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala. T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y1..7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Warren,O. R2 .....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy

Aliquippa,Pa. J5 .....7.50
Claymont,Del. C22 .....7.50
Coatesville,Pa. L7 .....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 .....8.30
Gary,Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 .....7.50

FLOOR PLATES

Cleveland J5 .....6.375
Conshohocken,Pa. A3 .6.375
Ind.Harbor,Ind. I-2 ...6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

PLATES, Ingot Iron

Ashland c.l. (15) A10 ..5.55
Ashland l.c.l. (15) A10 .6.05
Cleveland c.l. R2 .....6.05
Warren,O. c.l. R2 .....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa.(9) J5 ...5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ...5.675
Birmingham(9) C15 ...5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa.(9) U5 ...5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ...5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ...5.675
Fairless,Pa.(9) U5 ...5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ...5.675
Joliet,Ill. P2 .....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ...5.675
LosAngeles(9) B3 .....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ...6.025
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 .....6.375
Owensboro,Ky.(9) G8 ...6.025
Pittsburg,Calif.(9) C11..6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg. O4 .....6.425
Riverdale,Ill.(9) A1 ...5.675
Seattle A24, B3, N14..6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15 .5.675
Sterling,Ill.(9) N15 ....5.775
Struthers,O.(9) Y1 .....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11 .6.375
Warren,O. C17 .....6.052
Youngstown(9) R2,U5..5.675

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.725
Bethlehem,Pa. B2 .....6.725
Bridgeport,Conn. C32 ..6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 ....6.725
Clairton,Pa. U5 .....6.275
Detroit S41 .....6.725
Economy,Pa. B14 .....6.725
Ecorse,Mich. G5 .....6.725
Fairless,Pa. U5 .....6.875
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Owensboro,Ky. G8 ....6.725
Pittsburgh J5 .....6.725
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14..6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R.
High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 .....8.55
Lackawanna,N.Y. R2 ..8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 .....9.05
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLE; H.R. Carbon

Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ...5.675
Sterling,Ill. N15 .....5.775
Sterling,Ill.(1) N15 ...5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 .....6.52
SanFrancisco S7 .....6.52
Seattle B3 .....6.425

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Loaded
(Including loaded extra)
Carbon

LosAngeles P2, S30 ..11.75*

Alloy

Ambridge,Pa. W18 ...10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 .....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 .....10.175
Newark,N.J. W18 .....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.05c for Grade B.

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 .....7.65
BeaverFalls,Pa. M12,R2..7.65
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 .....7.65
Detroit B5, P17 .....7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ...7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2..7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 .....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 .....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 .....7.65
SpringCity,Pa. K3 .....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon
(Turned and Ground)

Cumberland,Md.(5) C19..6.55

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 .....9.025
BeaverFalls,Pa.M12,R2 9.025
Bethlehem,Pa. B2 .....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 .....9.025
Detroit B5, P17 .....9.225
Detroit S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 .....9.025
Hammond,Ind. J5, L2..9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. R5 .....9.025
Lackawanna,N.Y. B2..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ...9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 .....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 .....9.025
Willimantic,Conn. J5 ...9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 ....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft. Worth,Tex(4)(26)T4 5.925
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2,Y1 5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ...5.925
Kokomo,Ind. C16 ....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.925
Seattle A24, B3, N14 .6.425
S.Chicago,Ill. R2, W14..5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling Ill. (1) N15 ..5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ...6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.60
Lackawanna,N.Y. B2 ...7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ...7.60
Seattle A24, B3, N14 ..7.95
SparrowsPt. Md. B2 ....7.33
St. Paul U8 .....8.17
Williamsport,Pa. S19 ...7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.90
Economy,Pa.(D.R.)B14 18.55
Economy(Staybolt)B14 19.00
McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5, 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4)(44) I-2 5.675
ChicagoHts. (4) C2 ....5.675
Franklin,Pa. (3) F5 ..5.575
Franklin,Pa.(4) F5 ...5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O. (3) P11 ....5.575
Tonawanda(3) B12 ...5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ...5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 ..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 ....6.275

SHEETS, H.R., Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 ....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14..7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky. (8) A10 ..5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 ....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ...7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2 ..6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 ....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(37) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(38) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	....
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2....7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2.6.875‡
Ashland Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C-16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ...7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Wall Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 ....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50
Youngstown J5 .....7.50

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) ..9.525

SHEETS, Enameling Iron

Ashland Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Follansbee,W.Va. F4 ...8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 CarpenterSteelofN.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel Corp.
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Josiyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div. Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union CarbideMetalsCo.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring Corp.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div. Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 YoungstownSheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	5.10
Allenport,Pa. P7	5.10
Alton,Ill. L1	5.30
Ashland,Ky.(8) A10	5.10
Atlanta A11	5.10
Bessemer,Ala. T2	5.10
Birmingham C15	5.10
Conshohocken,Pa. A3	5.15
Detroit M1	5.10
Ecorse,Mich. G5	5.10
Fairfield,Ala. T2	5.10
Farrell,Pa. S3	5.10
Fontana,Calf. K1	5.825
Gary,Ind. U5	5.10
Ind.Harbor,Ind. I-2, Y1	5.10
Johnstown,Pa.(25) B2	5.10
Lackaw'na,N.Y.(25) B2	5.10
LosAngeles(25) B3	5.85
LosAngeles C1	8.60
Minnequa,Colo. C10	6.20
Riverdale,Ill. A1	5.10
San Francisco S7	6.60
Seattle(25) B3	6.10
Seattle N14	6.60
Sharon,Pa. S3	5.10
S.Chicago,Ill. W14	5.10
S.SanFrancisco(25) B3	5.85
SparrowsPoint,Md. B2	5.10
Torrance,Calif. C11	5.85
Warren,O. R2	5.10
Weirton,W.Va. W6	5.10
Youngstown U5	5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	8.40
Farrell,Pa. S3	8.40
Gary,Ind. U5	8.40
Houston S5	8.65
Ind.Harbor,Ind. Y1	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.60
Lowellville,O. S3	8.40
Newport,Ky. A2	8.40
Sharon,Pa. A2, S3	8.40
S.Chicago,Ill. W14	8.40
Youngstown U5, Y1	8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10	7.575
Bessemer,Ala. T2	7.575
Conshohocken,Pa. A3	7.575
Ecorse,Mich. G5	7.575
Fairfield,Ala. T2	7.575
Farrell,Pa. S3	7.575
Gary,Ind. U5	7.575
Ind.Harbor,Ind. I-2, Y1	7.575
Lackawanna,N.Y. B2	7.575
LosAngeles(25) B3	8.325
Seattle(25) B3	8.575
Sharon,Pa. S3	7.575
S.Chicago,Ill. W14	7.575
S.SanFrancisco(25) B3	8.325
SparrowsPoint,Md. B2	7.575
Warren,O. R2	7.575
Weirton,W.Va. W6	7.575
Youngstown U5, Y1	7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	5.35
Warren,O. R2	5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	7.425
Baltimore T6	7.425
Boston T6	7.975
Buffalo S40	7.425
Cleveland A7, J5	7.425
Dearborn,Mich. S3	7.425
Detroit D2, M1, P20	7.425
Dover,O. G6	7.425
Evanston,Ill. M22	7.525
Farrell,Pa. S3	7.425
Follansbee,W.Va. W10	7.425
Fontana,Calif. K1	9.20
FranklinPark,Ill. T6	7.525
Ind.Harbor,Ind. Y1	7.425
Indianapolis S41	7.575
LosAngeles C1, S41	9.30
McKeesport,Pa. E10	7.525
NewBedford,Mass. R10	7.875
NewBritain,Conn. S15	7.875
NewCastle,Pa. B4, E5	7.425
NewHaven,Conn. D2	7.875
NewKensington,Pa. A6	7.425
Pawtucket,R.I. R3	7.975
Pawtucket,R.I. N8	7.975
Philadelphia P24	7.875
Pittsburgh J5	7.425
Riverdale,Ill. A1	7.525
Rome,N.Y.(32) R6	7.425
Sharon,Pa. S3	7.425
Trenton,N.J.(31) R5	8.875
Wallingford,Conn. W2	7.875
Warren,O. R2, T5	7.425
Worcester,Mass. A7	7.975

STRIP, Cold-Rolled Alloy

Boston T6	15.90
Carnegie,Pa. S18	15.55
Cleveland A7	15.55
Dover,O. G6	15.55
Farrell,Pa. S3	15.55
FranklinPark,Ill. T6	15.55
Harrison,N.J. S18	15.55
Indianapolis S41	15.70
LosAngeles S41	17.75
Lowellville,O. S3	15.55
Pawtucket,R.I. N8	15.90
Riverdale,Ill. A1	15.55
Sharon,Pa. S3	15.55
Worcester,Mass. A7	15.85
Youngstown S41	15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.80
Dearborn,Mich. S3	10.80
Dover,O. G6	10.80
Farrell,Pa. S3	10.80
Ind.Harbor,Ind. Y1	10.80
Sharon,Pa. S3	10.80
Warren,O. R2	10.80

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	9.85	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)

	0.80C	1.05C	1.35C
Bristol,Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
New York W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

Weirton,W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

STRIP, C.R. Electrogalvanized

Cleveland A7	7.425*
Dover,O. G6	7.425*
Evanston,Ill. M22	7.525*
McKeesport,Pa. E10	7.50*
Riverdale,Ill. A1	7.525*
Warren,O. B9, S3, T5	7.425*
Worcester,Mass. A7	7.975
Youngstown S41, Y1	7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3	7.50
Sharon,Pa. S3	7.50

TIGHT COOPERAGE HOOP

Atlanta A11	5.65
Farrell,Pa. S3	5.525
Riverdale,Ill. A1	5.675
Sharon,Pa. S3	5.525
Youngstown U5	5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.60
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa,Pa. J5 (21-27 Ga.)	....	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)	....	7.90	....	....
Niles,O. R2 (20-27 Ga.)	....	7.90	8.10	8.30

TIN PLATE, Hot Dipped 1.25 1.50

Common Coke	lb	lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Ind.Harb. Y1	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5	$10.05
Irvin,Pa. U5	10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	....	9.875*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	..	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	....	9.875	11.70	12.40	13.55	14.65
Newport,Ky. A2	....	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	....	9.875	11.70	12.40	13.55	....
Vandergrift,Pa. U5	....	9.875	11.70	12.40	13.55	14.65
Warren,O. R2	....	9.875	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift,Pa. U5	8.10
Mansfield,O. E6	8.10
Warren,O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	..	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	8.00
Aliquippa,Pa. J5	8.00
Alton,Ill. L1	8.20
Atlanta A1	8.00
Bartonville,Ill. K4	8.10
Buffalo W12	8.00
Chicago W13	8.00
Cleveland A7, C20	8.00
Crawfordsville,Ind. M8	8.10
Donora,Pa. A7	8.00
Duluth A7	8.00
Fairfield,Ala. T2	8.00
Fostoria,O.(24) S1	8.10
Houston S5	8.25
Jacksonville,Fla. M8	8.35
Johnstown,Pa. B2	8.00
Joliet,Ill. A7	8.00
KansasCity,Mo. S5	8.25
Kokomo,Ind. C16	8.10
LosAngeles B3	8.95
Minnequa,Colo. C10	8.25
Monessen,Pa. P7, P16	8.00
Palmer,Mass. W12	8.30
Pittsburg,Calif. C11	8.95
Portsmouth,O. P12	8.00
Rankin,Pa. A7	8.00
S.Chicago,Ill. R2	8.00
S.SanFrancisco C10	8.95
SparrowsPoint,Md. B2	8.10
Sterling,Ill.(1) N15	8.00
Sterling,Ill. N15	8.10
Struthers,O. Y1	8.00
Waukegan,Ill. A7	8.00
Worcester,Mass. A7	8.30

WIRE, Cold Heading Carbon

Elyria,O. W8	8.00

Wire, Gal'd., for ACSR

Bartonville,Ill. K4	12.65
Buffalo W12	13.40
Cleveland A7	12.65
Donora,Pa. A7	12.65
Duluth A7	12.65
Johnstown,Pa. B2	13.40
KansasCity,Mo. U3	12.90
Minnequa,Colo. C10	12.775
Monessen,Pa. P7, P16	12.65
Muncie,Ind. I-7	13.60
NewHaven,Conn. A7	12.95
Palmer,Mass. W12	13.70
Pittsburg,Calif. C11	13.45
Portsmouth,O. P12	12.65
Roebling,N.J. R5	12.95
SparrowsPt.,Md. B2	13.50
Struthers,O. Y1	13.40
Trenton,N.J. A7	12.95
Waukegan,Ill. A7	12.65
Worcester,Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.09
LosAngeles B3	10.70
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
NewHaven,Conn. A7	10.05
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Worcester,Mass. A7,J4,T6	10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	16.50
Bartonville,Ill. K4	16.40
Chicago W13	16.30
Cleveland A7	16.30
Crawfordsville,Ind. M8	16.40
Fostoria,O. S1	16.30
Houston S5	16.55
Jacksonville,Fla. M8	16.65
Johnstown,Pa. B2	16.30
KansasCity,Mo. S5	16.55
Kokomo,Ind. C16	16.30
Minnequa,Colo. C16	16.55
Monessen,Pa. P16	16.30
Muncie,Ind. I-7	16.50
Palmer,Mass. W12	16.60
S.SanFrancisco C10	17.15
Waukegan,Ill. A7	16.30
Worcester,Mass. A7,J6	16.60

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

ROPE WIRE (A)

Bartonville,Ill. K4	13.45
Buffalo W12	13.45
Fostoria,O. S1	13.45
KansasCity,Mo. U3	13.70
Johnstown,Pa. B2	13.45
Monessen,Pa. P7	13.45
Muncie,Ind. I-7	13.65
Palmer,Mass. W12	13.75
Portsmouth,O. P12	13.45
Roebling,N.J. R5	13.75
St.Louis L8	13.45
SparrowsPt.,Md. B2	13.55
Struthers,O. Y1	13.45
Worcester,Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

Wire, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock — **Col.**

AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES — **Col.**

AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)(per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$9.24
Atlanta A11	10.36
Bartonville,Ill. K4	9.34
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	9.34
Donora,Pa. A7	9.24
Duluth A7	9.24
Fairfield,Ala. T2	9.24
Houston S5	10.51
Jacksonville,Fla. M8	9.34
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	9.24
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	9.34
LosAngeles B3	11.05
Minnequa,Colo. C10	9.49
Pittsburg,Calif. C11	9.94
S.Chicago,Ill. R2	9.24
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	10.36
Sterling,Ill.(37) N15	9.34

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.54
Atlanta A11	10.70
Bartonville,Ill. K4	9.64
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.64
Donora,Pa. A7	9.54
Duluth A7	9.54
Fairfield,Ala. T2	9.54
Houston S5	10.85
Jacksonville,Fla. M8	9.64
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	9.54
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.64
LosAngeles B3	11.40
Minnequa,Colo. C10	9.79
Pittsburg,Calif. C11	10.28
S.Chicago,Ill. R2	9.54
S.SanFrancisco C10	10.26
SparrowsPt.,Md. B2	10.70
Sterling,Ill.(37) N15	9.64

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.59
Atlanta A11	10.75
Bartonville,Ill K4	9.69
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.69
Donora,Pa. A7	9.59
Duluth A7	9.59
Fairfield,Ala. T2	9.59
Houston S5	10.90
Jacksonville,Fla. M8	9.69
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	9.59
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	9.69
LosAngeles B3	14.45
Minnequa,Colo. C10	9.84
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.59
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	10.75
Sterling,Ill.(37) N15	9.69

BALE TIES, Single Loop — **Col.**

AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill(7) N15	214

FENCE POSTS — **Col.**

Birmingham C15	177
ChicagoHts.,Ill. C2, I-2..	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed — **Col.**

AlabamaCity,Ala. R2	193*
Aliquippa,Pa. J5	190§
Atlanta A11	198§
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198

WOVEN FENCE, 9-15 Ga. — **Col.**

Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	192§
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE (16 gage)	**An'ld Galv. Stone**	**Stone**
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Cleveland A7	17.85	....
Craw'dville B8	17.95	19.80‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	18.95	19.80‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.25	18.80†
Minnequa C10	18.10	19.65**
P'im'r,Mass.W12	18.15	19.70†
Pitts.Calif. C11	18.20	19.75†
S.San.Fran. C10	18.20	19.75**
St'ling(37) N15	17.95	19.80
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WIRE, Merchant Quality (6 to 8 gage) — **An'd Galv.**

Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325§
Atlanta(48)A11	9.10	9.775§
Bartonville(48) K4	9.10	9.80
Buffalo W12	9.00	9.55†
Cleveland A7	9.00	....
Crawfordsville M8	9.10	9.80††
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55†
Houston(48) S5	9.25	9.80**
Jack'ville,Fla. M8	9.10	9.80‡‡
Johnstown(48) B2	9.00	9.675§
Joliet,Ill. A7	9.00	9.55†
KansasCity(48)S5	9.25	9.80**
Kokomo(48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625§
Minnequa C10	9.25	9.80**
Monessen(48) P7	8.65	9.35§
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775§
St'ling(37)(48) N15	9.10	9.80
Struthers,O. Y1	9.00	9.65‡
Worcester,Mass.A7	9.30	9.85†

Based on zinc price of: *13.50, †5c, §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

FASTENERS

(Consumer discounts, per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nuts 1¼ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

BOLTS, standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
*Bulk	50

*Hot galvanized or zinc plated lag bolts only—for package or bulk quantities use applicable list less bulk discounts.

HEXAGON NUTS, American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

CAP AND SETSCREWS

Fillister Head, Cap Screws, Coarse Thread:

Packages	+55
Bulk	+16

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter:	
Packages	+85
Bulk	+38
Setscrews, Square Head, Cup Point, Coarse Thread:	
Through 1 in. diam, 6 in. and shorter:	
Packages	+ 5
Bulk	+19
Through 1 in. diam., longer than 6 in.:	
Packages	+29

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85
⅞ in. and smaller by 6 in. and shorter: 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Alton,Ill. L1	$28.95	$43.40	$55.40	$73.00	$95.10
Buffalo W12	28.95	43.40	55.40	73.00	95.10
Cleveland A7	28.95	43.40	55.40	73.00	....
KansasCity,Mo. U3	29.85	43.00	55.40	73.00	95.10
Monessen,Pa. P16	32.15	48.20	61.55	81.10	105.65
NewHaven,Conn. A7	28.95	43.40	55.40	73.00	95.10
Pittsburg,Calif. C11	28.95	43.40	55.40	73.00	95.10
Minnequa,Colo. C10	28.95	43.40	55.40	73.00	95.10
Roebling,N.J. R5	28.95	43.40	55.40	73.00	95.10
SparrowsPoint,Md. B2	28.95	43.40	55.40	73.00	95.10
St.Louis L8	28.95	43.40	55.40	73.00	95.10
Waukegan,Ill. A7	28.95	43.40	55.40	73.00	95.10

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2½	12	49.24	57.72	43.70
2¾	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Standard All No. 2	Tee Rails 60 lb Under
Rails				
Bessemer,Pa. U5	5.75	5.60	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

SCREW SPIKES

Lebanon,Pa. B2	15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2,Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ¾" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.635c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds, 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+7.75
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+6.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 13.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80 50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.25	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.00	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51 75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates—Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33 75	36 95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60 40	65.65	....
321	31.20	34.50	37 75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24 60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	48.90	59.55	70.15	80.55	....
Nickel	41.65	51 95	63.30	72.70	....
Nickel, Low Carbon	41.95	52 60	63 30	74.15	....
Monel	43.35	53.55	63.80	74.05	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	$36.80	$44.20

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	V-Cr Hot Work (H-13)	0.550
Spec. Carbon (W-1)	0.385	W-Cr Hot Work (H-12)	0.530
Oil Hardening (O-1)	0.505	W Hot Wk. (H-21)	1.425-1.44
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	...	T-1	1.840
18	4	2	....	...	T-2	2.005
13.5	4	3	....	...	T-3	2.105
18.25	4.25	1	4.75	...	T-4	2.545
18	4	2	9	...	T-5	2.915
20.25	4.25	1.6	12.95	...	T-6	4.330
13.75	3.75	2	5	...	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago, Ill. R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69 00	69.50
New York, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKees Rocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Everett, Mass. E1	67.50	68.00	68.50	....
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	....	62.50‡	66.50	....
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035% max)	$73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	73.00
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075%)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Steel Service Center Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Atlanta	8.59§	9.86§	10.13	....	8.91	9.39	13.24#	....	9.40	9.29	11.21
Baltimore	9.80[a]	10.00[b]	10.06	....	11.45[c]	10.05[d]	11.80#	16.38	9.55	9.90[e]	10.50
Birmingham	9.43[a]	10.20[b]	....	....	10.91[c]	9.59[d]	13.14#	16.76	9.00	9.79[e]	10.90
Boston	10.07	11.42	11.77	53.50	12.17	10.19	13.30#	15.64	10.64	10.27	11.95
Buffalo	8.40	9.60	11.25	55.98	8.75	9.15	11.45#	15.40	9.25	9.20	10.75
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.25	9.45	10.90	53.00	8.51	8.99	9.15	15.05	9.00	8.89	10.20
Cincinnati	8.43	9.51	10.95	53.43	8.83	9.31	11.58#	15.37	9.56	9.27	10.53
Cleveland	8.54[a]	8.79[b]	10.94	52.33	10.32[c]	8.75[d]	11.25#	15.16	9.39	8.71[e]	10.50[f]
Dallas	8.80	9.30	....	....	8.85	8.80	....	....	8.75	9.15	10.40
Denver	9.40	11.84	12.94	....	9.43	9.80	11.19	....	9.84	9.76	11.08
Detroit	8.51	9.71	11.25	56.50	8.88	9.30	9.51	15.33	9.56	9.26	10.46
Erie, Pa.	8.35	9.45	9.95[10]	....	8.60	9.10	11.25	....	9.35	9.10	10.60
Houston	9.65[a]	9.65[b]	....	52.00	10.85[c]	8.90[d]	13.10#	16.55	8.35	9.65[e]	10.10
Jackson, Miss.	8.52	9.79	....	....	8.84	9.82	10.68	....	9.33	9.22	11.03
Los Angeles	8.70[2]	10.82[2]	12.20	57.60	9.15	9.10[2]	12.95[3]	16.35	9.00[2]	9.10[2]	11.30[2]
Memphis, Tenn.	8.59	9.80	....	....	8.84	9.32	11.25#	....	9.33	9.22	10.86
Milwaukee	8.39	9.59	11.04	....	8.65	9.13	9.39	15.19	9.22	9.03	10.34
Moline, Ill.	8.55	9.80	....	....	8.84	8.95	9.15	....	8.99	8.91	....
New York	9.17	10.49	11.35	53.08	9.64	9.99	13.25#	15.50	9.74	9.77	11.05
Norfolk, Va.	8.65	....	....	....	9.15	9.30	12.75	....	9.65	9.10	10.50
Philadelphia	8.20	9.55	10.89	52.17	9.25	9.40	11.95#	15.48	9.10	9.15	10.40**
Pittsburgh	8.54[a]	8.79[b]	10.76	52.33	10.30[c]	8.64[d]	11.25#	15.05	9.00	8.47[e]	10.26[f]
Richmond, Va.	8.65	....	10.79	....	9.15	9.55	....	....	9.65	9.10	10.60
St. Louis	8.63	9.83	11.28	....	8.89	9.37	9.78	15.43	9.48	9.27	10.58
St. Paul	8.80[a]	9.31[b]	10.54	....	10.32[c]	8.70[d]	11.49#	16.54	9.38	8.60[e]	10.49
San Francisco	9.65	11.10	11.40	55.10	9.75	10.15	13.60	16.25	9.85	10.00	12.35
Seattle	10.30	11.55	12.50	56.52	10.25	10.50	14.70	16.80[2]	10.20	10.10	12.50
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	10.30	11.55	12.50	57.38	10.75	11.00	14.70	16.80	10.20	10.10	13.00
Washington	9.15	....	....	....	9.65	10.05	12.50	....	10.15	9.60	11.10

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **⅛ in. and heavier; ††as annealed; ‡‡¾ in. to 4 in. wide, inclusive; #net price, 1 in. round C-1018.

[a]10 Ga.; [b]20 Ga.; [c]⅛ x 1 in.; [d]¾-2½ in.; [e]¼ x 84 in.; [f]¼ x 36 in.

Base quantities, 2000 to 4999 lb except as noted; cold-finished bars, 2000 lb and over except in Seattle, 2000 to 3999 lb; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Seattle, 30,000 lb and over; [2]—30,000 lb; [3]—1000 to 4999 lb; [5]—1000 to 1999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchens, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 straights.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid $26.50-$27; barge, Brownsville, Tex., $29-$29.50.

Canadian Steel

(Cents per pound, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:	
Carbon, Forging Quality (net ton)	$97.00
Alloy (net ton)	115.00
Wire Rods:	
Carbon ⅜" to under ¼ in.	5.30
Carbon, ¼ in. to 47/64 in.	5.70
Alloy	6.40
Wire (carload lots)	8.40
Bars & Small Shapes:	
Carbon, merchant quality	5.40
Carbon, special quality	5.85
Alloy	6.40
Bar Mill Bands:	
Carbon	5.40
Alloy	8.05
Structural Size Angles & Zees	5.40
Plates:	
Carbon	5.45
Sheets & Coils, Hot Rolled:	
Carbon Sheets	5.00
Carbon Strip	5.00
Sheets & Coils, Cold Rolled:	
Carbon Sheets	6.35
Carbon Strip (0.080 and lighter)	6.35
Carbon Strip (0.081 and heavier)	6.65
Sheets & Coils, Galvanized:	
Standard Quality	6.70
Culvert Quality	7.00
Sheets, Porcelain Enameling	7.45
Sheets & Coils, Electrical:	
Field Grade	9.00
Armature Grade	9.50
Electrical Grade	10.15
Tin Mill (Per Base Box; **Products** 100 lb basis wt)	
Coke Tin Plate (1.25 lb pot yield)	$10.60
Electrolytic Tin Plate (0.25 lb coating)	9.10
Black Plate	8.30
Nails, c.l. lots, (per keg)	
400 keg min.	$8.15

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. truckiots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	8.10††
Electrolytic Iron, Melting stock, 99.87% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 240 tons price is 22.75c)	
Annealed, 99.5% Fe	36.75
Unannealed (99+% Fe)	33.25
Unannealed (99+% Fe) (minus 325 mesh)	58.25
Powder Flake (minus 16 plus 100 mesh)	29.25
Carbonyl Iron:	
98.1-98.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500-lb drum freight allowed, c.l. 38.50; ton lots 40.50	
Antimony, 500-lb lots 42.00*	
Brass, 500-lb lots	*35.60-52.90†*
Bronze, 5000-lb lots	*54.00-57.60†*
Copper, electrolytic	14.25*
Copper, reduced	14.25*
Lead	7.50*
Manganese, Electrolytic: Minus 35 mesh	$1.00
Nickel	$1.15
Nickel-Silver, 5000-lb lots	*60.90-69.70†*
Phosphor-Copper, 5000-lb lots	*67.00*
Copper (atomized) 5000-lb lots	*47.50-65.50*
Solder	7.00*
Silicon	70.00*
Stainless Steel, 304	89.00*
Stainless Steel, 316	$1.07
Tin	14.00*
Zinc, 5000-lb lots	*21.20-34.40‡*
Tungsten:	Dollars
Carbon reduced, 98.8% min., minus 65 mesh	nom**
Chromium electrolytic 99.8% Cr, min., metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §Cutting and scarfing grade. **Depending on price of ore. ††Welding grade.

Ores

Lake Superior Iron Ore

(Prices effective at start of the 1959 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.55
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1959, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, dedd. E. Pa.

New Jersey, concentrates nom.

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	21.00†
Brazilian iron ore, 68.5%	21.00

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$17.50-18.00*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian 48-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian	
48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†
South African Transvaal	
44% no ratio	18.00†
48% no ratio	24.00-26.00†
Turkish	
48% 3:1	36.00-37.00†
Domestic Rail nearest seller	
18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked $1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

50-55%	$2.50-2.75
60-65%	2.80-3.20

Vanadium Ore

Cents per lb V_2O_5

Domestic 31.00

†Nominal.

Metallurgical Coke

Price per net ton

Beehive Ovens	
Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50
Oven Foundry Coke	
Birmingham, ovens	$30.35
Cincinnati, dedd.	33.34
Buffalo, ovens	32.00
Detroit, ovens	32.00
Pontiac, Mich., dedd.	33.95
Saginaw, Mich., dedd.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens:	
New England, dedd.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, dedd.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, dedd.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, dedd.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.

Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	5.00
Toluene, one deg. (dedd. east of Rockies)	25.00

Cents per lb, f.o.b. tank cars or tank trucks, dedd.

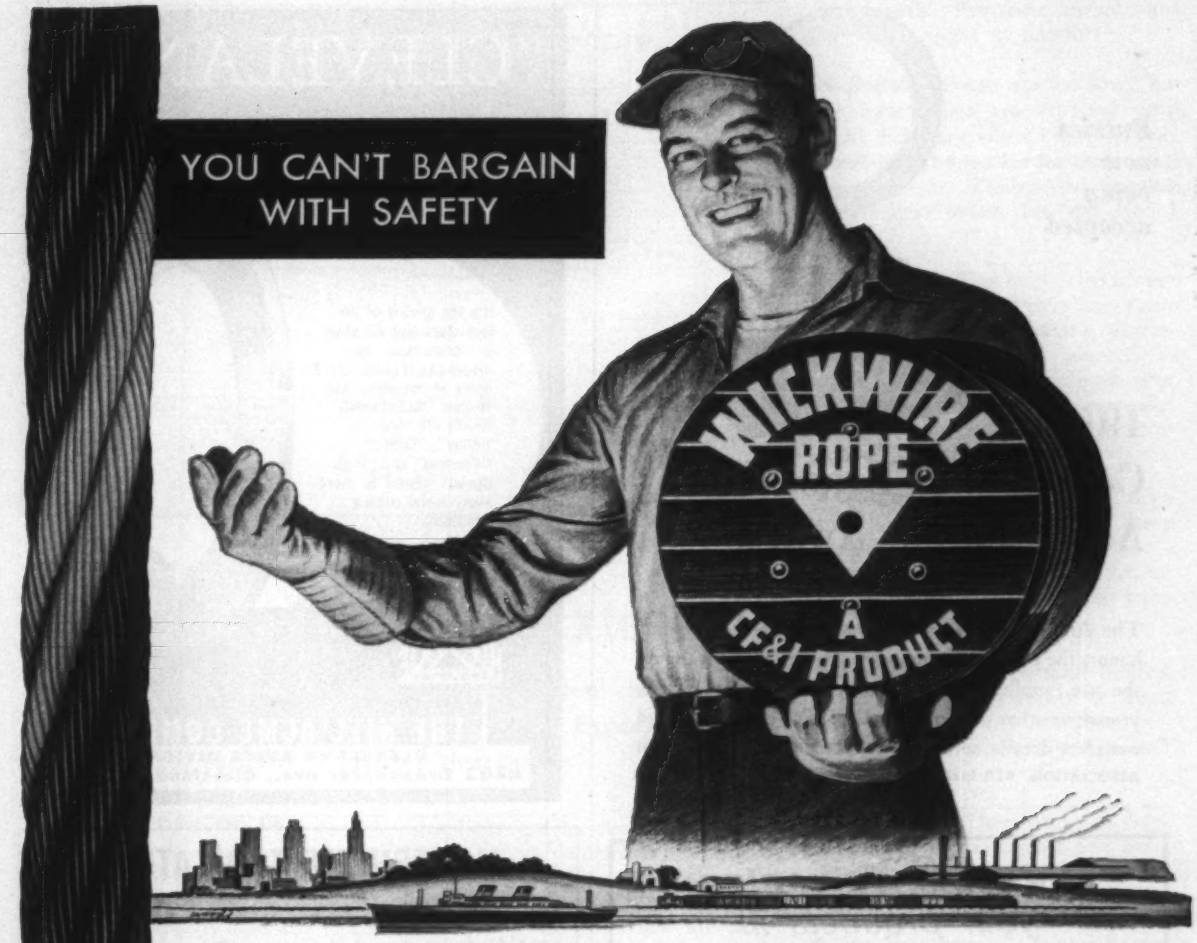
Phenol, 90 per cent grade	14.75
Per net ton bulk, f.o.b. cars or trucks, plant	
Ammonium sulfate, regular grade	$32.00

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	*$6.59*	*$6.64*	*$6.49*	*$6.34*	*$6.74*
Bar Size Angles	*6.25*	*6.30*	*6.15*	*6.05*	*6.40*
Structural Angles	*6.16*	*6.21*	*6.06*	*5.96*	*6.31*
J-Beams	*6.16*	*6.21*	*6.06*	*5.96*	*6.31*
Channels	*6.16*	*6.21*	*6.06*	*5.96*	*6.31*
Plates (basic bessemer)	*6.28*	*6.33*	*6.18*	*6.08*	*6.43*
Sheets, H.R.	*7.50*	*7.55*	*7.40*	*7.30*	*7.65*
Sheets, Galvanized, 20 Ga., 36 in. x 96 in.	*9.70*	*9.75*	*9.60*	*9.50*	*9.85*
Sheets, Galv. (in coils) 20 Ga., 48 in. wide	*9.80*	*9.85*	*9.70*	*9.60*	*9.95*
Sheets, C.R. (drawing quality)	*10.70*	*10.75*	*10.60*	*10.50*	*10.85*
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	*25.08*	*24.20*	*24.42*	*24.15*	*25.47*
Barbed Wire (†)	*6.80*	*6.85*	*6.70*	*6.60*	*6.95*
Merchant Bars	*6.69*	*6.74*	*6.59*	*6.49*	*6.84*
Hot-Rolled Bands	*7.90*	*7.95*	*7.80*	*7.70*	*8.05*
Wire Rods, Thomas Commercial No. 5	*6.60*	....	*6.45*	*6.45*	*6.70*
Wire Rods, O. H.	*7.05*		*6.90*	*6.90*	*7.15*
Bright Common Wire Nails (§)	*8.15*	*8.20*	*8.05*	*7.95*	*8.30*

†Per 82 lb net reel. §Per 100-lb keg, 20d nails and heavier.



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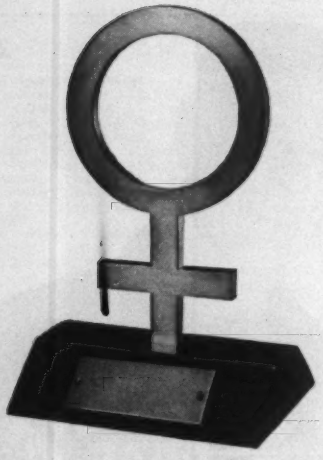

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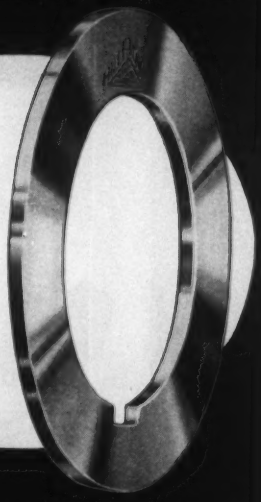

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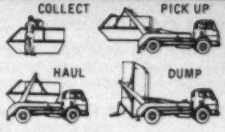

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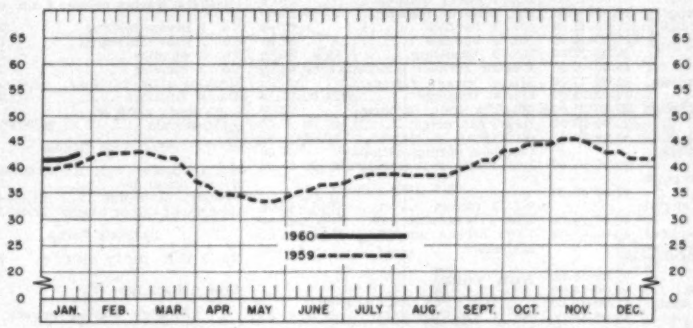
STEELMAKING SCRAP PRICE COMPOSITE

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania—Compiled by STEEL.



Jan. 20 1960	Week Ago	Month Ago	Year Ago	Dec. Avg.
$42.33	$41.67	$41.33	$40.67	$41.71

Scrap Price Advance Is Extended

STEEL's composite on No. 1 heavy melting steel rises another 66 cents to $42.33 on continued light sales. Exports are providing market support in Eastern districts

Scrap Prices, Page 106

● **Chicago**—Prices have edged up $1 to $2 a ton in scattered sales. The market is strong, but mill demand for material is light and tends to counteract trade enthusiasm. Volume trading doesn't seem imminent. Consumers frown on large commitments, and sellers prefer to limit tonnages in anticipation of a slowly rising market.

Open hearth grades are quoted $1 to $2 a ton higher, turnings and borings are up $1, and the foundry grades reflect a similar rise.

● **Pittsburgh**—The market is firm but quiet. Major consumers have filled their recent orders and give no indication when they'll resume buying. Sellers would probably have to take less than quoted prices if they wanted to unload a few cars now, but chances are good that they'll soon be in a stronger bargaining position. This week's industrial lists are expected to be large. Bidding should be active, and prices may be higher than last month's.

● **Philadelphia** — The market appears to be moving sidewise. Prices are unchanged with domestic buying light and in disappointing volume. Export demand is exerting a stabilizing influence. The only price revision last week was in mixed borings and turnings which are now nominally $23, delivered.

● **New York**—Brokers' buying prices are unchanged, with moderately good export business continuing to offset the lag in domestic buying.

● **Cleveland**—Bids on auto lists at the end of the month are expected to point the way for the February market. More ordering by the steel mills is expected. It's thought that heavy inroads into inventories will necessitate additional buying, with steelmaking operations promising to hold near capacity through the first quarter here and in the Valley.

● **Detroit**—Little market action is reported at the dealer level, although brokers have been handling some factory-to-mill transactions on No. 1 bundles and clean auto cast. Auto companies are turning out more than their January list commitments on those items, which gives rise to speculation: Prices may soften slightly at the end of the month. But there are no signs of lower prices at present.

● **Buffalo**—Prices are holding, but no new orders are expected until early February when the mills may come into the market for their usual requirements. Dealers are counting on modest orders for the No. 1 grades.

● **St. Louis**—The market continues in the doldrums. Prices are static with the mills not buying aggressively. Material is coming to dealers' yards in fair volume. For the most part, the market is steady, though some railroad scrap items are off slightly.

● **Birmingham**—Consumers of open hearth and electric furnace scrap continue out of the market, but a large cast iron pipe manufacturer has purchased tonnages of cast scrap at unchanged prices.

● **Houston**—With demand limited, Texas yards are operating at about half speed. Rainy weather curtailed activity during the first half of the month.

● **Cincinnati**—There's no new buying to provide a market test here. However, dealers are resisting pressure for lower prices.

● **San Francisco** — The mills are pressing for lower steel scrap prices, but sellers are holding firmly to their quotations. The trend appears to be downward, however, and some observers think there will be a price decline next month.

● **Seattle** — Dealers' supplies are ample, but little material is moving. The mills hold substantial inventories and will not be actively in the market until next month.

● **Portland, Oreg.**—The market is inactive here. Mill prices are unchanged at $38 for No. 1 heavy melting and $36 for No. 2 heavy melting. The largest local consumer is out of the market. No. 1 heavy melting unprepared is quoted at $35. Practically no interest is shown in No. 1 bundles. The export market is quiet.

● **Los Angeles**—Volume buying by the mills is lacking and export de-

(*Please turn to Page* 111)

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Jan. 20, 1960. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Jan. 20	$42.33
Jan. 13	41.67
Dec. Avg.	41.71
Jan. 1959	40.58
Jan. 1955	34.95

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	42.00-43.00
No. 2 heavy melting	36.00-37.00
No. 1 dealer bundles	44.00-45.00
No. 2 bundles	31.00-32.00
No. 1 busheling	42.00-43.00
No. 1 factory bundles	51.00-52.00
Machine shop turnings	23.00-24.00
Mixed borings, turnings	23.00-24.00
Shovel turnings	31.00-32.00
Cast iron borings	31.00-32.00
Cut structurals:	
2 ft and under	50.00-51.00
3 ft and under	49.00-50.00
Heavy turnings	35.00-36.00
Punchings & plate scrap	54.00-55.00
Electric furnace bundles	52.00-53.00

Cast Iron Grades

No. 1 cupola	50.00-51.00
Stove plate	46.00-47.00
Unstripped motor blocks	32.00-33.00
Clean auto cast	47.00-48.00
Drop broken machinery	54.00-55.00

Railroad Scrap

No. 1 R.R. heavy melt.	51.00-52.00
Rails, 2 ft and under	*64.00-65.00*
Rails, 18 in. and under	65.00-66.00
Random rails	61.00-62.00
Angles, splice bars	*59.00-60.00*
Railroad specialties	59.00-60.00
Rails, rerolling	66.00-67.00

Stainless Steel Scrap

18-8 bundles & solids	230.00-235.00
18-8 turnings	120.00-125.00
430 bundles & solids	125.00-130.00
430 turnings	55.00-65.00

CHICAGO

No. 1 hvy melt., indus.	*42.00-44.00*
No. 1 hvy melt., dealer	*41.00-42.00*
No. 2 hvy melting	*36.00-37.00*
No. 1 factory bundles	45.00-46.00
No. 1 dealer bundles	*41.00-42.00*
No. 2 bundles	*26.00-27.00*
No. 1 busheling, indus.	*42.00-44.00*
No. 1 busheling, dealer	*41.00-42.00*
Machine shop turnings	*23.00-24.00*
Mixed borings, turnings	*25.00-26.00*
Shovel turnings	*25.00-26.00*
Cast iron borings	*25.00-26.00*
Cut structurals, 3 ft	*49.00-50.00*
Punchings & plate scrap	*51.00-52.00*

Cast Iron Grades

No. 1 cupola	*55.00-56.00*
Stove plate	*50.00-51.00*
Unstripped motor blocks	*47.00-48.00*
Clean auto cast	*61.00-62.00*
Drop broken machinery	*61.00-62.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*45.00-46.00*
R.R. malleable	*63.00-64.00*
Rails, 2 ft and under	*60.00-61.00*
Rails, 18 in. and under	*61.00-62.00*
Angles, splice bars	*55.00-56.00*
Axles	*59.00-60.00*
Rails, rerolling	62.00-63.00

Stainless Steel Scrap

18-8 bundles, solids	220.00-225.00
18-8 turnings	115.00-120.00
430 bundles & solids	115.00-120.00
430 turnings	55.00-60.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	37.00-38.00
No. 2 heavy melting	24.00-25.00
No. 1 bundles	39.00-40.00
No. 2 bundles	22.00-23.00
No. 1 busheling	36.00-37.00
Machine shop turnings	14.00-15.00
Mixed borings, turnings	14.00-15.00
Shovel turnings	15.00-16.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	39.00-40.00
Heavy breakable	39.00-40.00
Unstripped motor blocks	31.00-32.00
Charging box cast	39.00-40.00
Clean auto cast	52.00-53.00

CLEVELAND

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	33.00-34.00
No. 1 factory bundles	47.00-48.00
No. 1 bundles	43.00-44.00
No. 2 bundles	26.00-27.00
No. 1 busheling	44.50-45.50
Machine shop turnings	16.00-17.00
Shovel turnings	22.00-23.00
Mixed borings, turnings	22.00-23.00
Cast iron borings	22.00-23.00
Cut foundry steel	43.00-44.00
Cut structurals, plate 2 ft and under	50.00-51.00
Low phos. punchings & plate	45.00-46.00
Alloy free, short shovel turnings	23.00-24.00
Electric furnace bundles	46.00-47.00

Cast Iron Grades

No. 1 cupola	55.00-56.00
Charging box cast	43.00-44.00
Heavy breakable cast	41.00-42.00
Stove plate	49.00-50.00
Unstripped motor blocks	39.00-40.00
Brake shoes	39.00-40.00
Clean auto cast	*56.00-57.00*
Burnt cast	47.00-48.00
Drop broken machinery	*56.00-57.00*

Railroad Scrap

R.R. malleable	64.00-65.00
Rails, 2 ft and under	65.00-66.00
Rails, 18 in. and under	66.00-67.00
Rails, random lengths	59.00-60.00
Cast steel	53.00-54.00
No. 1 railroad cast	58.50-59.50
Railroad specialties	57.00-58.00
Angles, splice bars	57.00-58.00
Rails, rerolling	74.00-75.00

Stainless Steel (Brokers' buying prices: f.o.b. shipping point)

18-8 bundles, solids	210.00-215.00
18-8 turnings	110.00-115.00
430 clips, bundles, solids	115.00-120.00
430 turnings	45.00-55.00

YOUNGSTOWN

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	36.00-37.00
No. 1 busheling	*47.00-48.00*
No. 1 bundles	46.00-47.00
No. 2 bundles	29.00-30.00
Machine shop turnings	18.00-19.00
Shovel turnings	23.00-24.00
Cast iron borings	23.00-24.00
Low phos.	48.00-49.00
Electric furnace bundles	48.00-49.00

Railroad Scrap

No. 1 R.R. heavy melt.	47.00-48.00

BUFFALO

No. 1 heavy melting	37.00-38.00
No. 2 heavy melting	33.00-34.00
No. 1 bundles	37.00-38.00
No. 2 bundles	27.00-28.00
No. 1 busheling	37.00-38.00
Shovel turnings	24.00-25.00
Machine shop turnings	20.00-21.00
Cast iron borings	22.00-23.00
Low phos. structurals and plate, 2 ft and under	45.00-46.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	50.00
No. 1 machinery	51.00-52.00

Railroad Scrap

Rails, random lengths	47.00-48.00
Rails, 3 ft and under	53.00-54.00
Railroad specialties	45.00-46.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	30.50-31.50
No. 1 bundles	36.00-37.00
No. 2 bundles	25.00-26.00
No. 1 busheling	36.00-37.00
Machine shop turnings	20.00-21.00
Mixed borings, turnings	20.00-21.00
Shovel turnings	22.00-23.00
Cast iron borings	21.00-22.00
Low phos. 18 in.	49.00-50.00

Cast Iron Grades

No. 1 cupola	49.00-50.00
Heavy breakable cast	44.00-45.00
Charging box cast	44.00-45.00
Drop broken machinery	59.00-60.00

Railroad Scrap

No. 1 R.R. heavy melt.	44.00-45.00
Rails, 18 in. and under	63.00-64.00
Rails, random lengths	54.00-55.00

PHILADELPHIA

No. 1 heavy melting	42.00
No. 2 heavy melting	37.00-38.00
No. 1 bundles	47.00
No. 2 bundles	26.00
No. 1 busheling	47.00
Electric furnace bundles	49.00
Mixed borings, turnings	*23.00†*
Shovel turnings	26.00-27.00
Machine shop turnings	23.00
Heavy turnings	31.00-35.00
Structurals & plates	49.00-51.00
Couplers, springs, wheels	51.00
Rail crops, 2 ft & under	66.00-68.00

Cast Iron Grades

No. 1 cupola	43.00
Heavy breakable cast	47.00
Drop broken machinery	54.00-55.00
Malleable	68.00†

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	32.00-33.00
No. 1 bundles	36.00-37.00
No. 2 bundles	20.00-21.00
Machine shop turnings	11.00-12.00
Mixed borings, turnings	14.00-15.00
Shovel turnings	15.00-16.00
Low phos. structurals & plates	39.00-40.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	37.00-38.00

Stainless Steel

18-8 sheets, clips, solids	200.00-205.00
18-8 borings, turnings	85.00-90.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	85.00-90.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*37.00*
No. 2 heavy melting	25.50-26.50
No. 1 bundles	*36.00-37.00*
No. 1 busheling	*36.00-37.00*
Machine shop turnings	*12.00-13.00*
Shovel turnings	*16.00-17.00*
No. 1 cast	39.00-40.00
Mixed cupola cast	*36.00-36.50*
No. 1 machinery cast	*40.00-42.00*

BIRMINGHAM

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	31.00-32.00
No. 1 bundles	36.00-37.00
No. 2 bundles	25.00-26.00
No. 1 busheling	40.00-41.00
Cast iron borings	14.00-15.00
Machine shop turnings	23.00-24.00
Shovel turnings	25.00-26.00
Bar crops and plate	44.00-45.00
Structurals & plates	*44.00-45.00*
Electric furnace bundles	40.00-41.00
Electric furnace:	
3 ft and under	39.00-40.00
2 ft and under	38.00-39.00

Cast Iron Grades

No. 1 cupola	53.00-54.00
Stove plate	53.00-54.00
Charging box cast	29.00-30.00
Unstripped motor blocks	42.00-43.00
No. 1 wheels	*45.00-46.00*

Railroad Scrap

No. 1 R.R. heavy melt.	39.00-40.00
Rails, 18 in. and under	*57.00-58.00*
Rails, rerolling	61.00-62.00
Rails, random lengths	*53.00-54.00*
Angles, splice bars	49.00-50.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	35.00-37.00
No. 2 heavy melting	33.00-34.00
No. 1 bundles	42.00
No. 2 bundles	*26.00*
No. 1 busheling	42.00
Machine shop turnings	19.00
Shovel turnings	21.00

Cast Iron Grades

No. 1 cupola	53.00
Charging box cast	46.00
Heavy breakable cast	44.00
Unstripped motor blocks	45.00
Clean auto cast	56.00
Stove plate	*46.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*44.00*
Rails, 18 in. and under	*54.00*
Rails, random lengths	50.00
Rails, rerolling	*61.00*
Angles, splice bars	50.00

HOUSTON

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	39.00
No. 2 heavy melting	36.00
No. 1 bundles	39.00
No. 2 bundles	25.00
Machine shop turnings	19.00-20.00
Shovel turnings	23.00
Low phos. plate & structurals	46.00-47.00†

Cast Iron Grades

No. 1 cupola	45.00-46.00†
Heavy breakable	33.00
Foundry malleable	41.00-42.00
Unstripped motor blocks	36.50-37.50

Railroad Scrap

No. 1 R.R. heavy melt.	39.00

LOS ANGELES

(Brokers' buying prices)

No. 1 heavy melting	40.00
No. 2 heavy melting	*34.00*
No. 1 bundles	36.00
No. 2 bundles	21.00
Machine shop turnings	18.00
Shovel turnings	18.00
Cast iron borings	18.00
Cut structurals and plate 1 ft and under	48.00

Cast Iron Grades

No. 1 cupola	47.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00

PORTLAND, OREG.

No. 1 heavy melting	38.00
No. 2 heavy melting	36.00
No. 1 bundles	36.00
No. 2 bundles	25.00
Shovel turnings	22.00
Electric furnace bundles	*44.00-45.00*

Cast Iron Grades

No. 1 cupola	40.00-42.00
Heavy breakable	35.00
Unstripped motor blocks	31.00
Stove plate	25.00

SEATTLE

No. 1 heavy melting	35.00†
No. 2 heavy melting	32.00
No. 1 bundles	32.00
No. 2 bundles	22.00†
Machine shop turnings	17.00†
Mixed borings, turnings	17.00†
Electric furnace No. 1	42.00-43.00

Cast Iron Grades

No. 1 cupola	34.00†
Heavy breakable cast	28.00†
Unstripped motor blocks	26.00†
Stove plate (f.o.b. plant)	21.00†

SAN FRANCISCO

No. 1 heavy melting	40.00
No. 2 heavy melting	36.00
No. 1 bundles	36.00
No. 2 bundles	22.00
Machine shop turnings	16.00
Mixed borings, turnings	16.00
Cast iron borings	16.00
Heavy turnings	16.00
Shovel turnings	16.00
Cut structurals, 3 ft	44.00

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices)

No. 1 heavy melting	32.25
No. 2 heavy melting	28.25
No. 1 bundles	32.25
No. 2 bundles	24.00
Mixed steel scrap	24.25
Mixed borings, turnings	13.00
Busheling, new factory:	
Prepared	32.25
Unprepared	26.25
Shovel turnings	17.00

Cast Iron Grades†

No. 1 machinery cast	46.50-48.00

*Delivered to docks.
†Nominal.
‡F.o.b. Hamilton, Ont.

Your new plant or expansion idea

Raw materials available?

Right process chosen?

Location correct?

Capacity adequate?

Economically sound?

Readily financed?

Kaiser Engineers designs and builds major facilities for the Steel industry, and is U. S. licensor for the proven L-D Process of oxygen steel making.

Among KE's most valued services are sound, searching economic analyses, feasibility studies and site evaluations. In a word—*Pre-Engineering*—impartial, outside analysis which helps you decide whether to proceed with, defer, or modify the project.

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• KE projects include work in Argentina, Australia, Brazil, Formosa, Japan, New Zealand, as well as Canada and the United States. Assignments range from preliminary planning to plant construction.

5459-9

Lead-Zinc Battle Coming

Witnesses at Tariff Commission hearing call for end of quotas, but they disagree on whether industry needs help. Problem will go to Congress when commission issues report Mar. 31

Nonferrous Metal Prices, Pages 110 & 111

MEMBERS OF the U. S. Tariff Commission were left last week with the tough, unpleasant job of sifting voluminous testimony that conflicted in viewpoint, interpretation, and objectives after listening for five days to witnesses for the domestic lead and zinc industry.

• **Battle Lines Drawn**—One salient fact came out of the hearings: No one likes the present system of quotas which restricts imports to 483,000 tons of zinc and 350,000 tons of lead a year. But that's about the only thing everyone agreed on. One bloc wants free trade, the other some type of protection in the form of higher tariffs or subsidies. Complicating matters is the question of how foreign manufactured lead and zinc products should be treated. (They're now excluded from quotas and have been coming into the U. S. in increasing quantities.)

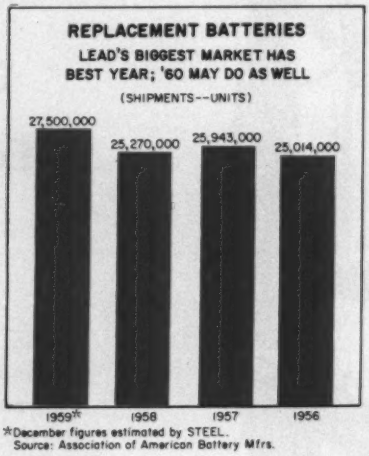
On Jan. 14, by a 3 to 2 vote, the commissioners found "no injury" to the zinc sheet industry in a separate investigation initiated by domestic companies. Some people feel the decision stems from the fact the commission didn't want to handle the problem separately and will cover it in the over-all report on the lead-zinc question.

• **Report to Congress**—By special directive, the commission has to report its findings and recommendations on the whole lead-zinc question to Congress no later than Mar. 31. Washington sources believe it will take that long for the commission to write its report.

Congressional observers believe legislators will be sympathetic to any commission proposal for corrective legislation. If "no injury" is found by the commissioners, it will be tougher for supporters to push legislation through, but a strong Congressional segment will try. In any event, look for the status quo to be maintained until the commission issues its report.

In the Markets

• **Zinc**—Rolled product prices have been bumped 1 to 2 cents a pound to mark the first change since Dec. 1, 1958. Producers cite higher labor and raw material costs as reasons. Elsewhere in the market, slab zinc sales are in a bit of a lull following a period of heavy buying.



*December figures estimated by STEEL.
Source: Association of American Battery Mfrs.

• **Antimony** — Prices of imported metal are up 0.5 to 1 cent a pound. The cause: A shortage of metal in the New York market (brought on by continuation of the lengthy strike at Belgian smelters) at a time when demand is heavy.

• **Silver**—U. S. consumption in the arts and industries hit 100 million ounces last year, an 18 per cent increase over the 1958 figure, says Handy & Harman, New York. Most significant increases were in the industrial field.

More Forecasts for '60

Prognostications for 1960 continue to be bullish.

• **Copper**—Brass mill output will rise 5 per cent and shipments will run close to 1 million tons, an increase of 50,000 tons over 1959's, believes T. E. Veltfort, managing director, Copper & Brass Research Association. U. S. mine output should be close to 1.16 million tons and refined production about 1.5 million tons, he adds.

• **Aluminum**—Shipments should be up 10 to 15 per cent from 1959's 2.45 million tons, savs Business & Defense Services Administration.

• **Zinc**—Consumption will climb 15 to 17 per cent from 1959's estimated total of 940,000 tons, predicts the BDSA.

• **Magnesium**—Consumption should rise 10 to 15 per cent, says the BDSA.

• **Nickel**—The BDSA sees a consumption level of around 127,500 tons, a 15 per cent gain over 1959.

• **Titanium** — Shipments of mill products will drop to around 2600 tons compared with 3000 tons in 1959, believes the BDSA. Reason: Cancellation of aircraft construction programs which would have used substantial amounts of titanium.

NONFERROUS PRICE RECORD

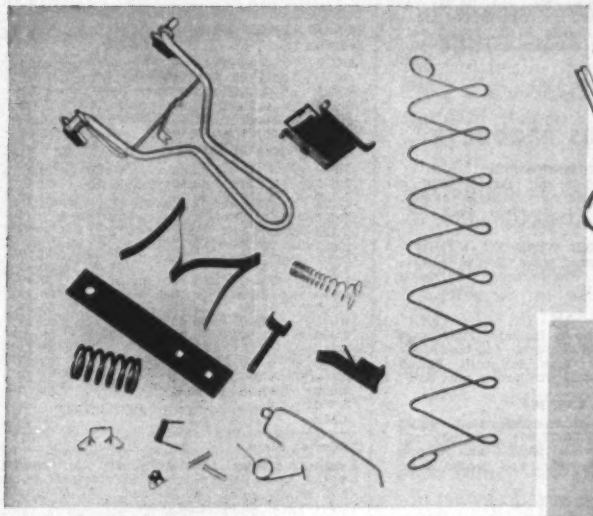
	Jan. 20 Price	Last Change	Previous Price	Dec. Avg	Nov. Avg	Jan., 1959 Avg
Aluminum	26.00	Dec. 17, 1959	24.70	25.300	24.700	24.700
Copper	33.00-35.00	Dec. 23, 1959	33.00	33.269	32.420	29.212
Lead	11.80	Dec. 21, 1959	12.30	12.338	12.800	12.415
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	100.375	Jan. 20, 1960	100.25	99.130	100.985	99.409
Zinc	13.00	Jan. 8, 1960	12.50	12.500	12.500	11.500

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig 99.8%, Velasco, Tex.

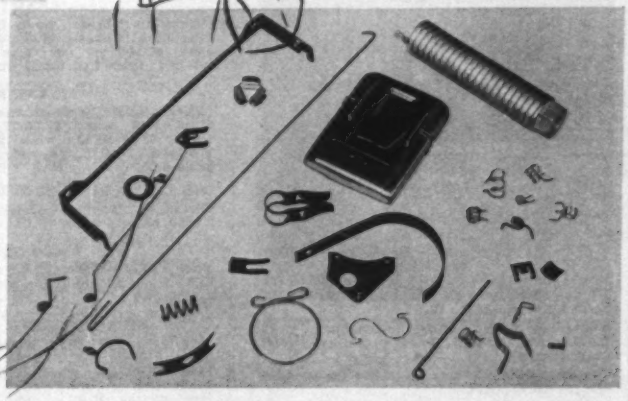
From Hunting to Hi-Fi . . .

There's a Spring in your Hobby

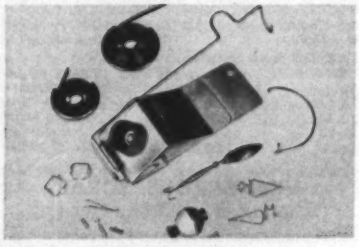
The booming market of hobbies and sports is typical of the far-reaching use of A.S.C. products. Often small but always important, springs make better products possible — and A.S.C. Divisions make better springs through constant research and experiment. Write for "The Picture Book of Springs."



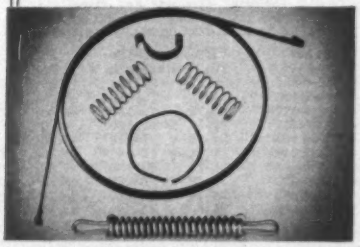
HUNTING — Ammunition clips, trigger springs and gun parts for civilian and military use; even a precision sling shot frame.



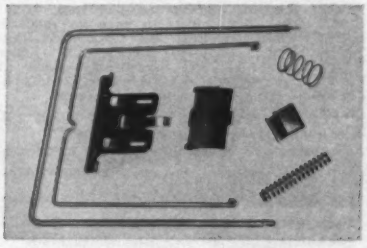
MUSIC — Coils and clips for radio, TV and record players; violin mute springs, guitar levers, springs for cornets, pianos, organs.



FISHING — power springs for reels; wire and flat springs for rod holders, lures; and a frog holder frame.



BOATING — starter springs and parts for outboard motors; shock-absorber spring for trailers; rope tightener spring.



PHOTOGRAPHY — view finder frames, shutter springs and stampings for movie and still cameras.

Associated Spring Corporation

General Offices: Bristol, Connecticut

Wallace Barnes Division, Bristol, Conn. and Syracuse, N. Y.
B-G-R Division, Plymouth and Ann Arbor, Mich.
Seaboard Pacific Division, Gardena, Calif.
Cleveland Sales Office, Cleveland, Ohio
Raymond Manufacturing Division, Corry, Penna.
Ohio Division, Dayton, Ohio
F. N. Manross and Sons Division, Bristol, Conn.
San Francisco Sales Office, Saratoga, Calif.
William D. Gibson Division, Chicago 14, Ill.
Milwaukee Division, Milwaukee, Wis.
Dunbar Brothers Division, Bristol, Conn.
Wallace Barnes Steel Division, Bristol, Conn.
Canadian Subsidiary: The Wallace Barnes Co., Ltd., Hamilton, Ontario and Montreal, Quebec

5813

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 29.90; No. 43, 29.70; No. 195, 30.70; No. 214, 31.50; No. 356, 28.60; 30 lb ingots; 10 lb ingots, add 0.4 cent per lb; 6 lb ingots, add 0.6 cent per lb.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 25.00-26.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.50 per lb deld.

Cobalt: 99+%, $1.75 per lb for 500-lb keg, $1.77 per lb for 100 lb case; $1.82 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.

Copper: Electrolytic, 33.00 deld.; custom smelters, 35.00; lake, 33.00 deld.; fire refined, 32.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $75-80 per troy oz nom.

Lead: Common, 11.80; chemical, 11.90; corroding, 11.90, St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 50 lb, $11 per lb, f.o.b. Minneapolis; 50-99 lb, $10; 100-499 lb, $9.50; 500 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $210-212 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel, 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-100 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $77-80 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $7.00 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom.; sheet, $55 per lb nom.

Tellurium: $3.00 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 100.375.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $3.50-4.25.

Zinc: Prime western, 13.00; brass special 13.25; intermediate, 13.50 East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 14.25-14.50; special high grade, 14.50-14.75 deld. Diecasting alloy ingot No. 3, 16.25-16.50; No. 2, 16.75-17.00; No. 5, 16.50-16.75 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8 per lb; 100-500 lb, $7.00 per lb; over 500 lb, $6.50 per lb.

(Note: Chromium, maganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 27.25-29.00; No. 12 foundry alloy (No. 2 grade), 25.00-25.25; 5% silicon alloy, 0.60 Cu max., 26.25; 13 alloy, 0.60 Cu max., 26.25; 195 alloy, 28.00-28.75; 108 alloy, 25.50-25.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 25.75; grade 2, 24.50; grade 3, 23.50; grade 4, 22.75.

Brass Ingot: Red brass, No. 115, 30.75; tin bronze, No. 225, 41.50; No. 245, 36.00; high-leaded tin bronze, No. 305, 35.25; No. 1 yellow, No. 405, 24.75; manganese bronze, No. 421, 29.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.975, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 38.35; l.c.l., 38.98. Weatherproof, 20,000-lb lot, 38.55; l.c.l., 39.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.50 per cwt; pipe, full coils, $17.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $7.25-17.00; sheared mill plate, $5.25-10.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $4.00-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base, f.o.b. customer custody.

Thicknes Range (in.)	Widths (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.10-47.70
0.136-0.096	24-72	72-180	45.50-48.70
0.096-0.077	24-72	72-180	46.20-50.00
0.077-0.068	24-72	72-180	46.70-51.70
0.068-0.061	24-72	72-180	46.70-55.00
0.061-0.048	24-72	72-180	47.30-57.30
0.048-0.038	24-72	72-180	47.80-60.20
0.038-0.030	24-72	72-180	48.20-65.30
0.030-0.024	24-60	72-180	48.70-56.60
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-36	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; lengths, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100-F, a903-F	44.60	49.40
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4	51.80	58.90
7075-T6*.	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base, 12 ft lengths.

Diam. (in.)*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	72.90	75.80	....	....
0.188	....	....	....	78.20
0.250	58.00	61.60	70.70	72.30
0.375	57.20	62.40	69.00	70.50
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	57.20	62.40	69.00	70.50
0.625	57.20	62.40	65.80	66.60
0.750	55.70	60.70	59.60	62.60
0.875	55.70	60.70	59.60	62.60
1.000	55.70	60.70	59.60	62.60
1.125	53.30	58.30	57.50	60.40
1.250	53.30	58.30	57.50	60.40
1.375	53.30	58.30	57.50	60.40
1.500	53.30	58.30	57.50	60.40
1.625	51.00	55.60	....	58.20
1.750	51.00	55.60	56.30	58.20
1.875	51.00	55.60	....	58.20
2.000	51.00	55.60	56.30	58.20
2.250	49.50	54.00	....	58.20
2.500	49.50	54.00	....	58.20
2.750	47.90	52.20	....	58.20
3.000	47.90	52.20	....	58.20
3.250	....	52.20	....	....
3.375	....	52.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 47.20-56.90; 6061, 43.20-56.90; 7075, 61.50-71.20; 7079, 66.50-76.20.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft. lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 31.55; 1¼ in., 42.75; 1½ in., 51.05; 2 in., 61.70; 3 in., 123.40; 4 in., 169.55; 5 in., 229.60; 6 in., 304.60; 8 in., 458.40; 10 in., 706.45 (3-24 ft. lengths).

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	44.70-46.20	53.20-59.00
15-17	44.70-46.20	55.60-60.80
18-23	45.20-46.80	57.70-66.40
24-32	45.20-46.80	65.60-78.80
33-38	48.80-51.40	82.30-93.40
39-44	58.70-62.40	99.90-1.210

MAGNESIUM

Sheets and Plate: AZ31B standard grade, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.10; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 25.75-26.25; No. 2 heavy copper and wire, 22.75-23.25; light copper, 21.25-21.75; No. 1 composition red brass, 18.50-18.75; No. 1 com-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES e (Based on copper at 33.00c)		
	Sheets, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	57.13b	54.86c	....	58.32	29.000	29.000	28.250
Yellow Brass	50.57	36.06d	50.86	54.23	22.250	21.250	20.250
Low Brass, 80%	53.53	53.22	53.82	57.09	24.750	24.500	24.000
Red Brass, 85%	54.58	54.27	54.87	58.14	25.750	25.500	25.000
Com. Bronze, 90%	56.17	55.86	56.46	59.48	26.750	26.500	26.000
Manganese Bronze	58.86	52.21	62.69	....	20.875	20.625	19.875
Muntz Metal	53.20	48.26	....	....	20.875	20.625	20.125
Naval Brass	55.12	48.68	61.43	58.78	20.750	20.500	20.000
Silicon Bronze	62.86	61.80	62.15	80.79	28.375	28.125	27.375
Nickel Silver, 10%	65.98	68.06	68.06	....	28.875	26.625	14.937
Phos. Bronze	77.44	78.19	77.69	79.37	29.875	29.625	28.625

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 17.25-17.75; new brass clippings, 16.00-16.50; light brass, 12.25-12.50; heavy yellow brass, 13.25-13.75; new brass rod ends, 14.00-14.50; auto radiators, unsweated, 14.50-15.00; cocks and faucets, 15.50-16.00; brass pipe, 15.75-16.20.

Lead: Soft scrap lead, 8.00-8.25; battery plates, 3.00-3.25; linotype and stereotype, 9.00-9.50; electrotype, 7.25-7.75; mixed babbitt, 9.50-10.00.

Monel: Clippins, 28.00-29.00; old sheets, 24.00-26.00; turnings, 20.00-22.00; rods, 28.00-29.00.

Nickel: Sheets and clips, 52.00-54.00; rolled anodes, 52.00-54.00; turnings, 39.00-40.00; rod ends, 52.00-54.00.

Zinc: Old zinc, 4.50-4.75; new diecast scrap, 4.00-4.25; old diecast scrap, 2.50-2.75.

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.50-15.00; mixed high copper clips, 12.50-13.00.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 12.75-13.25; clean borings and turnings, 10.00-10.50; segregated low copper clips, 16.75-17.25; segregated high copper clips, 16.00-16.50; mixed low copper clips, 16.00-16.50; mixed high copper clips, 15.50-16.00.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.50-11.75; clean borings and turnings, 10.50-11.00; segregated low copper clips, 15.75-16.25; segregated high copper clips, 14.75-15.25; mixed low copper clips, 15.25-15.75; mixed high copper clips, 14.25-14.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 59.00; light scrap, 54.00; turnings and borings, 39.00.

Copper and Brass: No. 1 heavy copper and wire, 27.50; No. 2 heavy copper and wire, 26.00; light copper, 24.00; refinery brass (60% copper) dry copper content, 24.75.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 27.50; No. 2 heavy copper and wire, 26.00; light copper, 24.00; No. 1 composition borings, 22.50; No. 1 composition solids, 23.00; heavy yellow brass solids, 16.75; yellow brass turnings, 15.50; radiators, 18.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.50

Copper: Flat-rolled, 50.04; oval, 48.00; 5000-10,000 lb; electrodeposited, 42.50; 2000-5000 lb lots; cast, 45.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 118.50; 200-499 lb, 117.00; 500-999 lb, 116.50; 1000 lb or more, 116.00.

Zinc: Balls, 20.25-20.50; flat tops, 20.25-20.50; flats, 23.00-23.25; ovals, 22.25-22.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.40 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,900 lb, 61.90.

Copper Sulphate: 100-1900 lb, 16.00; 2000-5900 lb, 14.00; 6000-11,900 lb, 13.75; 12,000-22,900 lb, 13.50; 23,000 lb or more, 13.00.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,990 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 78.50; 100-600 lb, 69.20; 700-1900 lb, 66.40; 2000-9900 lb, 64.60; 10,000 lb or more, 63.30.

Stannous Chloride (Anhydrous): 25 lb, 153.80; 100 lb, 148.90; 400 lb, 146.50; 800-19,900 lb, 105.60; 20,000 lb or more, 99.50.

Stannous Sulphate: Less than 50 lb, 139.00; 50 lb, 109.00; 100-1900 lb, 107.00; 2000 lb or more, 105.00.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 105*)

mand continues slow. Dealers foresee no early change in their market position. Recently No. 2 heavy melting declined $2 a ton to $34, lowest in many weeks.

Structural Shapes . . .

Structural Shape Prices, Page 96

Structural steel demand is holding up well, though there have been some cutbacks in orders for standard shapes. They have been offset by increasing pressure for wide flange sections. Fabricators are estimating on an increasing amount of work. But they say awards so far this year have not increased noticeably.

Deliveries on wide flange shapes range 18 to 21 weeks; standard structurals are readily available for delivery in 10 to 12 weeks.

Most fabricators are receiving poststrike orders for plain material in heavier volume. Result: Improved shop operating cycles. But shipments of fabricated material are not back to normal.

Expected price increases later this year are contributing to market uncertainty. At the same time, competition for new work is stiff. More bridge tonnage is coming out for

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PLANT SUPERINTENDENT for Structural Steel, Fabricating and Erection Company-20,000 ton capacity. To take complete charge of fabrication of structural steel for commercial, institutional and industrial buildings in Eastern States. Minimum requirements five years experience supervising shop employing approximately 100 personnel. Send complete resume, listing all employment, experience, education and salary requirements. Box No. 821, STEEL, Penton Bldg., Cleveland 13, Ohio.

SALESMAN—Experienced salesman to contact original equipment manufacturers in sale of iron castings. Must be able to recognize prospective customers and figure costs to be competitive. Should have a foundry background with some college training. Headquarter in central Wisconsin and service North Central States. Please give complete resume of experience in first reply. Write Box No. 823, STEEL, Penton Bldg., Cleveland 13, Ohio.

METALLURGICAL ENGINEER under 30 years of age who has completed military training to take charge of research program for development of hot-dip nonferrous coatings on steel wire. Opportunity for advancement into a general research program with a long-established and progressive organization. Send complete and detailed description of qualifications and background. Reply Box 824, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

MECHANICAL ENGINEER, 45, graduate, 20 years tube mill plant and project engineering; including design, specifications, forward planning, and new construction. Desires responsibilities at departmental or corresponding administrative level. Reply Box 822, STEEL, Penton Bldg., Cleveland 13, Ohio.

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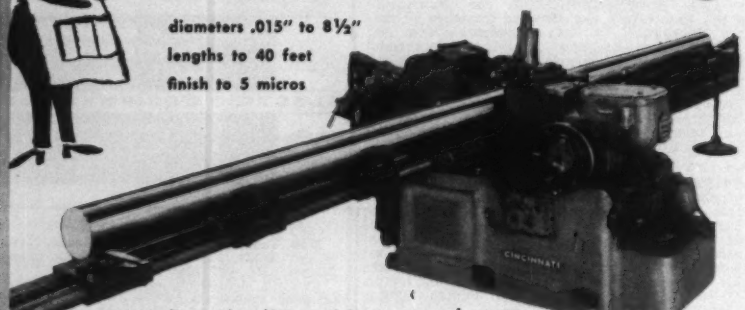

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estimates for delivery in the second and third quarters.

Distributors . . .

Prices, Page 101

A major distributor in the St. Louis district has substantially reduced its prices for hot rolled steel products. The reductions range $6.40 to $7.20 a ton, covering sheets, plates, bars, and structurals. Other distributors are expected to take similar action. The theory is that the revisions reflect the difference between rail and barge rates in steel costs.

Ferroalloys . . .

E. J. Lavino & Co., Philadelphia, reduced base prices on standard ferromanganese $25 a ton to $245, Sheridan, Pa., effective Jan. 19. It was the first change in the ferromanganese price since September, 1957, when the company reduced its published quotation $10 a ton.

Explanation for the reduction was not immediately made known by Lavino. At least one other producer has taken similar action. Some observers think imports are having a bearish influence on the domestic market.

Recently announced higher prices and new analysis specifications on charge grade ferrochrome alloys, effective Jan. 1, so far have failed to take hold in the market on a broad scale. Producers generally have not followed the action of one interest in putting the new listing into effect.

Pig Iron . . .

Pig Iron Prices, Page 101

The merchant iron market is still fairly routine, with foundries buying their needs on a short term basis. They are confident of plentiful supplies. Some foundries, especially those serving the automotive and railroad equipment fields, report a gradual pickup in demand for castings. It should be reflected soon in larger orders for merchant iron.

Consumption of iron by producers of cast iron pipe still lags. The Burlington, N. J., producer continues strikebound and the Florence, N. J., foundry is operating only four days a week. Soil pipe producers and job shops are consuming iron at a modest rate.

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IN

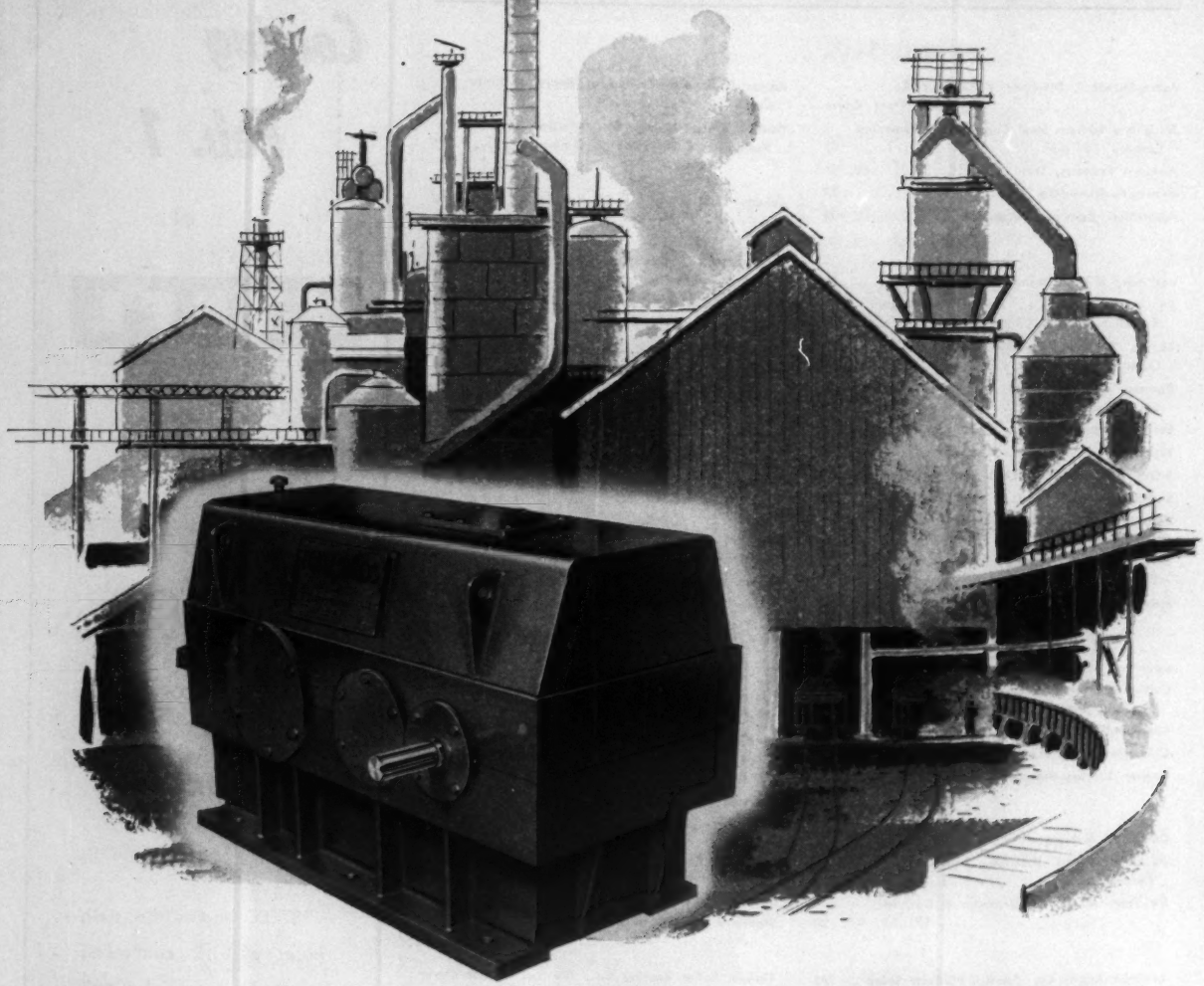
STEEL

Metal Stocks Recovering

STEEL begins the sixth year of its continuing quarterly survey of metalworking's inventory positions in steel and nonferrous products.

Watch next week for a report that shows industry is reviving rapidly after the steel and copper strikes that plagued us in 1959.

Foote Bros. Drives in the PRIMARY METALS INDUSTRIES



ALL STEEL *Maxi-Power...*

maximum performance drive in a tough steel housing

Add a functionally designed and carefully engineered, high strength fabricated steel housing to the basic heavy duty Maxi-Power Parallel Shaft Helical Gear Drive components, and you get a unit that is capable of resisting severe external impact, in addition to delivering maximum performance.

Maxi-Power Drives are found in the Primary Metals Industries wherever power demands are heavy, and operating conditions require the ultimate in strength, stamina and efficiency.

The heavy, precision machined steel bed of these drives keeps broad faced helical gearing in precise alignment to provide a smooth, overlapping mesh with close backlash tolerances. Tooth deflection is uniform under the heaviest loads. Heavy duty anti-friction bearings are conservatively rated to handle severest shock loads.

Maxi-Power Drives are available in nine combinations of shaft assemblies to permit a variety of gear drive arrangements between the prime mover and driven equipment. Maxi-Power Drives are available in Single, Double, and Triple Reductions. Standard Ratios are from 2.08 to 1 and up to 360 to 1. Capacities to 1550 HP.

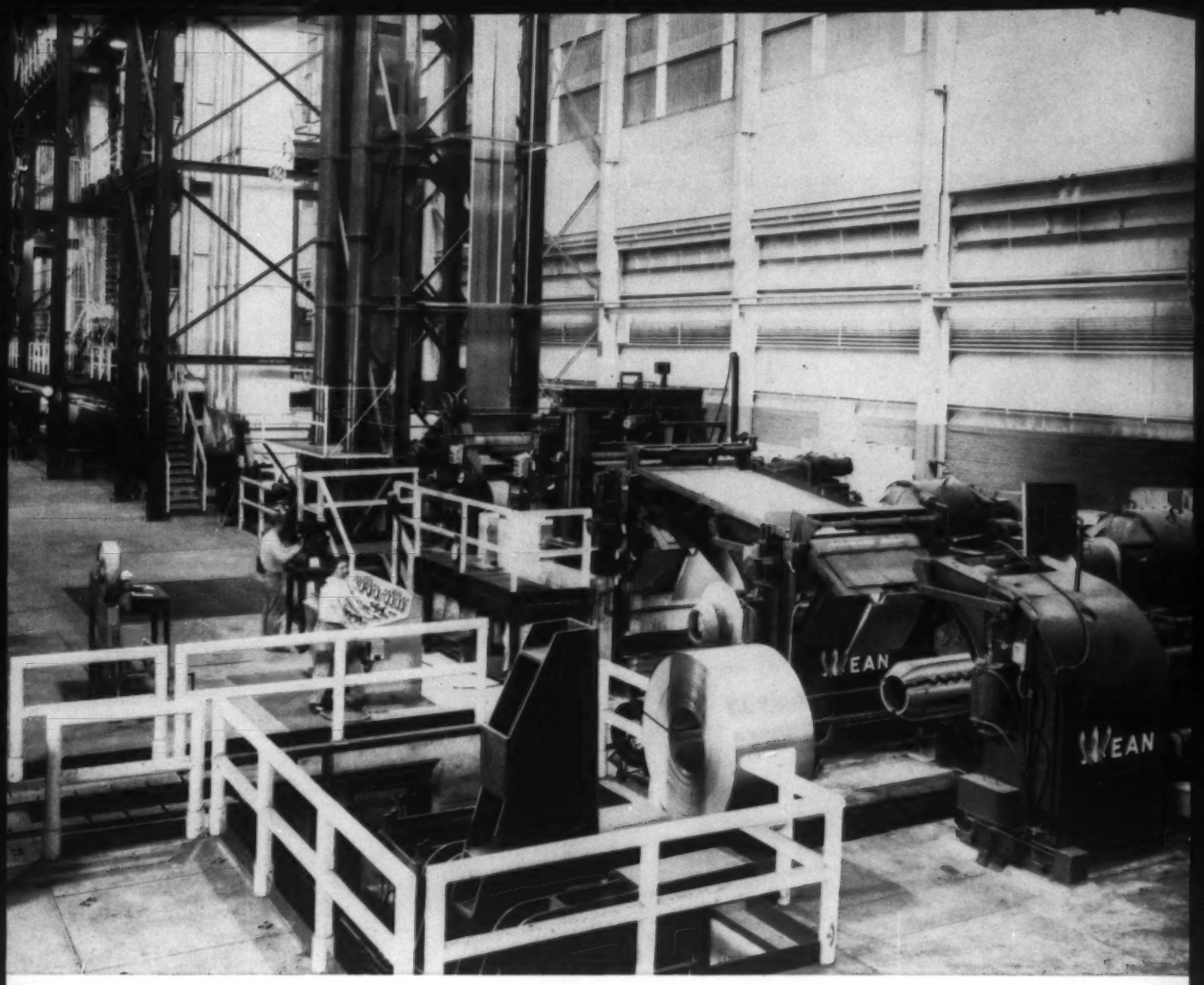
Why not get the complete story on Maxi-Power soon? Write for Engineering Manual MPB and full details on the All Steel Drive today.

FOOTE BROS. (FB) **GEAR AND MACHINE CORPORATION**

4583 South Western Boulevard, Chicago 9, Illinois

POWER TRANSMISSION DRIVES

UNLIMITED MOUNTING POSITIONS



Wean incorporates new design features in Wheeling Steel's tin plate annealing line

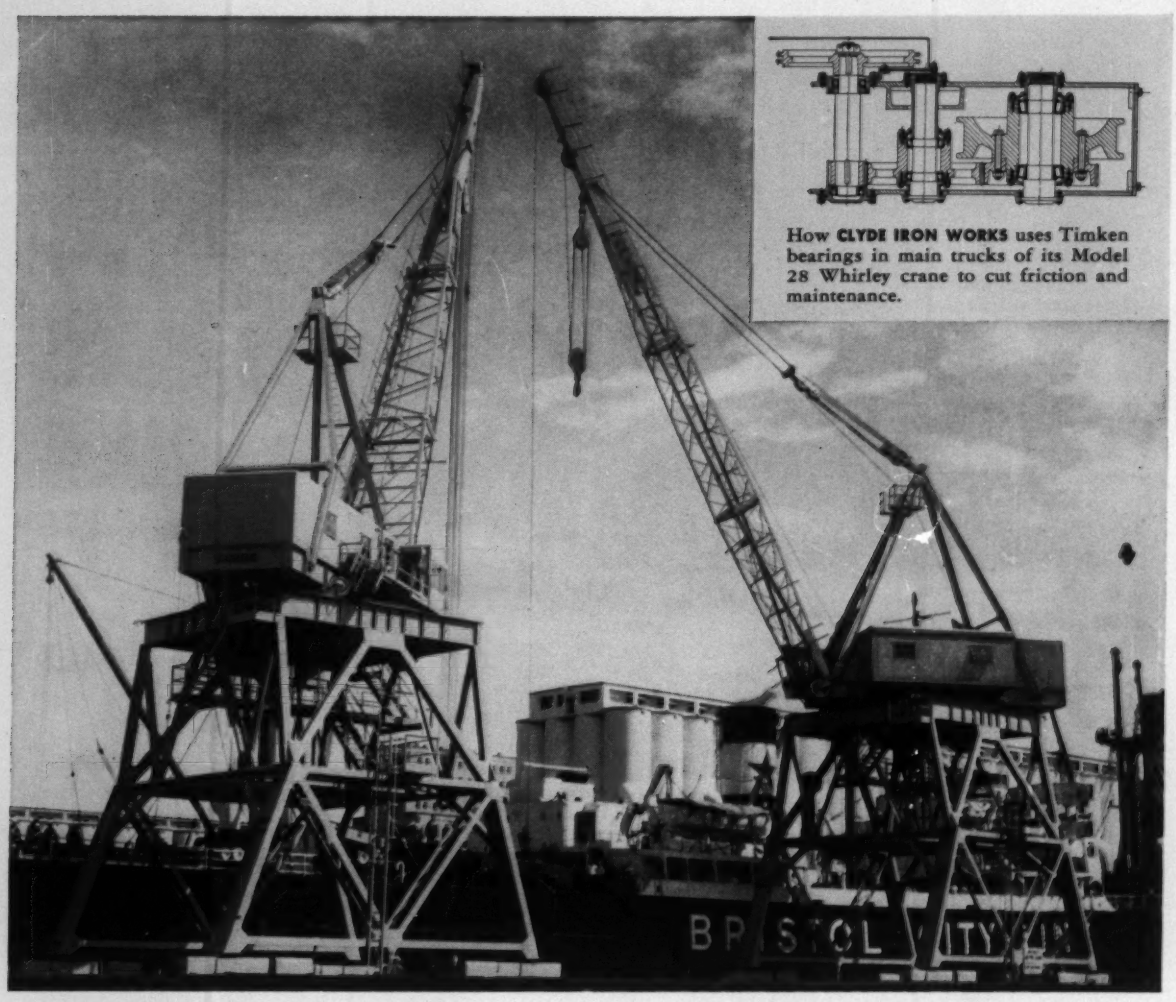
The most recent addition to Wheeling Steel Corporation's tin plate processing facilities at its Yorkville plant was this Wean continuous annealing line. Designed to produce a wide range of closely controlled temper tin plate, the continuous annealing line was put into full-scale operation in May, 1959.

Among this line's new features are (1) improved design looping towers for entry and exit strip storage; (2) extra-high freeboards to check splashing of solutions in the cleaning tanks; (3) controlled atmosphere jet cooling system to bring strip to handling temperature; (4) a single, traveling down-ender to handle two recoilers. All tin plate gauges can be annealed on this new high speed Wean line.

Wean has established a long-standing partnership with the steel industry to fill the anticipated needs of its customers. Why not call upon Wean to assure proper planning for your expansion program or in modernization of your older facilities.

WEAN

THE WEAN ENGINEERING COMPANY, INC. • WARREN, OHIO



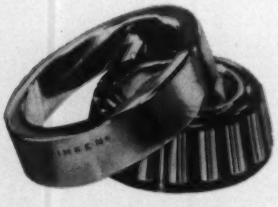
How **CLYDE IRON WORKS** uses Timken bearings in main trucks of its Model 28 Whirley crane to cut friction and maintenance.

68 TIMKEN® bearings give giant cranes more sensitive control, save power and maintenance

FIRST cranes of their type to use Timken® tapered roller bearings in propelling trucks, these Clyde 90-ton Whirleys roll easier with less power. And 20 Timken bearings at other vital points permit sensitive control, cut maintenance because they . . . 1) *Practically eliminate friction.* They're geometrically designed and precision-made to roll true. 2) *Take all loads.* The taper lets Timken bearings take *both* radial and thrust loads. Full-line contact between rollers and races provides extra capacity.

And you get added advantages such as service from graduate engineer salesmen qualified to work with your purchasing, engineering and production people. Service based on the most advanced bearing research and testing facilities in the industry.

Timken Company leadership gives you: *1) Quality you can take for granted. 2) Service you can't get anywhere else. 3) The best-known name in bearings. 4) The pace setter in lower bearing costs.* The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steels and Removable Rock Bits.*



BETTER-NESS rolls on

TIMKEN®

tapered roller bearings